THE

AMERICAN JOURNAL OF PHARMACY.

MAY, 1868.

CRYOLITE.

By Samuel F. Simes.

(An Inaugural Essay, presented to the Philadelphia College of Pharmacy.)

Cryolite, or Kryolite, as it is differently spelt, is a fluoride of sodium and aluminum, of a pale grayish-white, snow-white, or yellowish-brown color. It derives its name from two Greek words: *Κρυος*, cold, and *λιθος*, stone, or ice-stone; its appearance when wet resembling ice, while its insolubility in water makes it allied to stone.

This mineral, which, though so little known at present, is now taking such an active part in the manufactures and arts, is limited, or found only in certain localities. Small and scattered fragments have been found at Miask, in the Ural Mountains, but so rarely as to make it form a rare specimen. Its occurrence in Greenland, the country from which it is obtained in immense quantities, is also limited as to situation, being only thus largely obtained from the mines of Ivigtout, West Shore, South Greenland, on Arsuk Fiord, between Julian's Hope and Fredericks, lat. 61° N., long. 48° W. The main deposit of it here forms a mass about 600 feet in length, and 200 feet in breadth, it being of plutonic origin of unknown depth. In giving a more minute description of its formation I may say, however, that it lies in a bay or cavity, at the base of the marine plateau of the granite

hills that rise at a short distance from the edge of the waters of the river.

Like most mineral deposits it lies at an angle (of about 40°), underrunning the granite mountains, the other face descending with the waters of the bay. The shores of the Fiord are very bold, so that no soundings can be had scarcely a vessel's length from shore.

Chemical Composition.

Cryolite, as I before stated, is a fluoride of sodium and aluminum; it will therefore have as its formula ($3Na\,Fl + Al_2\,Fl_3$) sodium 3 equivalents, 2 eq. of alumina, and 6 eq. of fluorine:

3Na =	69
2Al =	27·26
6Fl =	114
	210·26 equivalents.

As it is found, it is in the form of crystalline mass, having a sp. gr. 2·95, hardness 2·05, or a little more than alabaster. Large portions of it are often found perfectly colorless and pure, and unmixed with foreign matter, while other portions of it contain crystals of spathic iron ore (spathic iron is a carbonate of iron, an ore of iron having a foliated structure, and a yellowish or brownish color), galena or sulphide of lead, copper pyrites with silver, iron pyrites, etc.; all of which, though, are easily removed by mechanical means, and do not take any part in the chemical decomposition or processes to which cryolite is subjected in the arts.

The value—I may say the main value of cryolite, as a source of soda and alumina, is dependent upon the extraordinary purity that attends its proportions when uesd on the large scale in these industrial enterprises. The carbonate and hydrate of soda, when obtained by the ordinary processes, from the decomposition of common salt, are always contaminated with more or less of the foreign salts, remaining undecomposed from the processes through which they pass, or introduced unavoidably as impurities in the ingredients consumed. With cryolite, however, it is different; the decomposition is so simple, the manipulations so

few, and the ingredients which are used so pure in themselves, that no difficulty exists in obtaining these chemical products in quantities of hundreds of tons, and in a state of almost absolute purity, that were before considered of impossible attainment in quantities greater than those which could be obtained in an analytical laboratory.

In order to separate the alumina and soda, the following process must be resorted to; and for the extraction of the soda, and the manufacture of its carbonate and separation of the alumina, the so-called dry process is used. This consists first in grinding together under vertical mill-stones or chasers, a mixture composed of one equivalent of cryolite (previously powdered, and sifted through fine wire gauze), along with a little more than 6 eq. of carbonate of lime, or slaked lime. This mixture, which must be an intimate and perfect one, is then exposed in quantities; about 1000 lbs. at a time, to a low red heat in furnaces constructed in a peculiar manner, with double fireplaces, one at each end; the flame from one passing under the hearth, and then uniting with the other, and both together passing over the mixture of cryolite and lime, in order that the heat may be kept uniform throughout the mass. This is then continued for about two hours, though care must be taken to avoid the materials fusing together. The ash thus produced is taken out and allowed to cool, when it is then placed in large iron leach-tanks, with false bottoms, and leached with hot water until all soluble matter is removed. Now the insoluble residue in the tanks consists of fluoride of calcium, 6 eq., which is dried, and has now become an article of great value to metallurgists in reducing gold and other ores, and as a good flux for silicates. The solutions resulting from the leaching processes are collected into large iron tanks, and when mixed together should have the sp. gr. of about 30° Baumé. The solution consists of equal quantities of aluminate of soda, and also either carbonate or hydrate of soda, as one of the other forms of lime have been used.

In order to separate the alumina and convert the soda into the carbonate, the solution is now pumped into large horizontal cylindrical vessels, which are from 40 to 50 feet in length, and are provided with machinery for agitating through their contents

a continuous stream of carbonic acid gas, which is the result of the combustion of the coke or pure lime kiln, in which coke is used as fuel. In a few hours the absorption of carbonic acid gas is complete, and the alumina separates in the form of a fine granular powder, which is a terhydrate of alumina. The contents of the agitator are now put into suitable vessels, and then allowed to settle. The clear solution of carbonate of soda having a density of about 31° Baumé, it is then run off into flat pans, and is evaporated more; when about 37° B. it is removed to cast-iron pans to crystallize and form sal soda, or, as it is commonly known, washing soda. Then what are known as the mother liquors are returned again to the pans, and remixed with a new batch of liquor, and again evaporated and crystallized.

For converting the alumina into a sulphate, it is added, in small portions at a time, to a boiling solution of dilute sulphuric acid of about 30° B., until rather more alumina has been used than is sufficient to form the tersulphate of alumina, the chemical formula of which is $Al_2O_3+3SO_3$, having an excess of alumina always present. After boiling for a few hours the liquor is tested, and as it is prepared in the arts to have the proportions of a slightly basic sulphate, these are adjusted so that for each equivalent of alumina present there should be $2\frac{8}{10}$ eq. of sulphuric acid, or $\frac{2}{10}$ of an eq. less than the sulphate, as it exists in common alum. The solution is then allowed to remain at rest for some days, until perfectly clear, when it is decanted into copper vessels, and evaporated until a drop of it solidifies into a hard brittle mass. It is then collected into leaden moulds to cool, when it is packed in boxes or barrels for market.

Sulphate of alumina, as thus prepared, is of a white translucent color, having the hardness and appearance of alabaster. It contains merely traces of iron, and, as before said, there is present in combination also sulphuric acid, as with alumina in common alum. It also contains about 15 per cent. of alumina, or about one-half more than is present in an equal weight of common potash alum. It is on account of its basic properties, and consequent freedom from acid, its small amount of iron, its trifling cost, that by calico printers, sugar refiners, paper makers, &c., it is consumed in immense quantities. Sulphate of alumina of

this character can be prepared only from alumina from cryolite, as that prepared from alum, clays, or other sources of alumina, cannot be free from a great excess of acid, which undoubtedly destroys its usefulness for many purposes, and injures it for art. The solution of carbonate of soda, before described, can of course be applied to the manufacture of caustic soda, by heating it with freshly slacked lime, in the ordinary manner practiced with ash and other commercial forms of carbonate, but it is advantageous to use the following modification of the process known as the wet process.

In this mode of manufacture the cryolite is added gradually to a boiling milk of lime, contained in an upright cylinder or agitator, provided with a stirrer attached to a vertical axis. Now in this process, thus employed, about 15,000 lbs. of quicklime are slacked in a large wooden vessel, and thoroughly mixed with enough water to render the mixture fluid. It is then run into the agitator, and boiled by injecting steam. Having come to the boiling point, the requisite proportion of cryolite, in a very fine powder, is added, and the boiling continued until, by testing, the complete decomposition of the cryolite, and the absence of the alumina in solution, is ascertained. The contents of the agitator are then disposed of upon filters of fire brick, through which the caustic solution is filtered, leaving the fluoride of calcium in a pasty slop upon the filter. This is then treated with hot water, which extracts the soda liquor by displacement. The caustic soda liquor is now evaporated in iron pans up to a density of 28° B., when the concentration is completed in cast-iron kettles, until finally the caustic is fused in quantities of 8000 lbs. each, at a full red heat, and poured into iron moulds to cool and harden. I have learned from parties who are connected with the works of the Pennsylvania Salt Manufacturing Company, at Natrona, near Pittsburg, which company has the exclusive right to import from Greenland this mineral called cryolite, that at their works from 30,000 to 40,000 lbs. of cryolite are thus treated every day. But further, now, the resulting soda is of nearly chemical purity, and I think superior to any otherwise made, hydrate of soda, containing of 84 per cent. actual hydrate, being produced without difficulty; the impossibility of obtaining

nearly pure lime readily, free from silicates, &c., being the only obstacle in the way of absolute chemical purity.

The amount of cryolite imported into the United States in 1867 was 8000½ tons, all of which was entered through the port of Philadelphia. The two principal uses to which cryolite is applied in this country are as follows: 1st, the preparation of the salts of soda and of alumina from the sodium and aluminum contained in it; 2d, the manufacture of opaque "white glass," or, as it is sometimes called, "hot-cast porcelain." Having dwelt at some length on its first use, as designated, I will now endeavor to state its second.

The application of cryolite to the manufacture of the new porcelain, or opaque glass, promises to be one of those discoveries, simple in themselves, that at times almost subvert the course of trade and manufacture. From this material (which is simply glass, so far as the mode of working is concerned) is furnished, at less than the cost of the cheapest ordinary white or flint glass, and with the facility attending working common blown or pressed glass, any article of any shape that can be made from glass; exactly resembling the finest French porcelain in appearance and beauty, but far surpassing it, as well as glass, in toughness, strength, and capability of standing sudden changes of temperature. The ingredients used in its manufacture consist of cryolite 10 lbs., white sand 20 lbs., and oxide of zinc 5 lbs.,—the dirty discolored oxide, worth less than half the price of the white oxide of commerce, answering well for this purpose. The fusion of the ingredients is effected at the same heat, and in the usual manner practised in the flint glass factories. In this manner can be made not only the articles ordinarily made of glass or porcelain, but also tiles, mantel-pieces, mouldings, statuary ware, mortars, pill tiles, evaporating dishes, funnels, ointment jars, and in fact any and everything capable of being cast, blown or moulded whilst in a melted state, and at a mere trifling cost.

The business of making these articles from cryolite is as yet in its infancy. One establishment in this city alone, and I believe this is the only one anywhere, is working exclusively on it, consuming from 500 to 1000 tons of cryolite per annum; but its use will necessarily become general, either as a speciality, or in

connection with the ordinary white or transparent glass. Having obtained from the factory of this "hot-cast porcelain" several mortars, funnels and evaporating dishes, and tested them fully and satisfactorily, I am able to state that they all have their advantages over the ordinary ware now in use. The mortars presented at all times a much whiter color, and standing more pounding, or trituration, than the wedgewood mortar commonly used; and the evaporating dishes resisting the heat of both the sand and water baths; at the same time being able to purchase them at about one-half the cost of ordinary porcelain. Not only these bulky and useful articles are manufactured, but also the finest parlor ornaments and lamp shades are made, and decorated and finished in a most beautiful manner at the establishment, which is situated in the upper part of Kensington, on York Avenue in Philadelphia.

The Danish Government, by a concession from King Christian IX, dated September, 1864, granted the exclusive right to mine cryolite to the "Cryolite Mine of Handelselshabet," a company organized in Copenhagen. This company contracted with the "Pennsylvania Salt Manufacturing Company" for a minimum supply of 6000 tons yearly, or as much more as they could be able to use, on the continents of North and South America. This year (1867) the Company imported over 8000 tons, and sent out to Greenland during the summer nineteen vessels, having an average capacity of 450 tons, of which two were lost in the ice, and one has probably wintered there. The approach to the coast is always considered dangerous, on account of the immense fields of ice which are in hot weather most likely to be met with, descending from the northern latitudes. These fields of ice consist in part of drift or pack ice, and in part of icebergs, and sometimes form a thick and impenetrable belt of upwards of 80 to 100 miles in width. This ice, however, mainly descends from the eastern coast of Greenland, where at all times the ocean current flowing south is so laden with ice as to render the shore absolutely inaccessible, no access having been had within the past six centuries. If this icy belt was a continuous one during the open season, navigation would be as impossible in the northern latitudes as it is on the eastern coast; but on the western coast of Greenland the wind is from the north, and scatters the

ice so that a good navigator, availing himself of the openings, can sail in or out without serious delay. Skill and experience are of course required,—several vessels every year paying the penalty for the want of knowledge or discretion of their masters, by being caught and crushed in the closing ice-packs. No loss of life has occurred as yet in this trade, the ice affording a safe refuge for the crew until they are removed by the Esquimaux, or escape by their boats to the settlement. The open mines of Ivigtout are worked only during the summer season, from May to October, during which time about 150 men are employed. The amount of cryolite now annually consumed in the manufacture of soda alone is about 6000 tons. Over half a million dollars have been invested in the extensive works of the Pennsylvania Salt Manufacturing Company at Natrona, where sal soda, bicarbonate, alumina, &c., are manufactured from this wonderful mineral, cryolite, giving employment to over 500 men. The alumina manufactured there is supplied to the largest makers of alum in this country; and enough can be obtained from 13,440,000 lbs. of cryolite to produce all the alum consumed in the United States. The various manufactures from cryolite have a market value, at present gold rates, of over one and a half million dollars per annum.

Philadelphia, January, 1868.

EXPERIMENTS WITH PAPER FILTERS.

By Charles E. Avery,
Student in the Massachusetts Institute of Technology.

The filter most commonly employed in analytical laboratories is a circular piece of paper folded twice upon itself into the form of a quadrant, and supported on a glass funnel with straight sides. This filter, though commendable in so far as it is capable of supporting the weight of a considerable column of liquid without breaking, is objectionable, inasmuch as liquids cannot pass through it so rapidly as is desirable. Since at almost every point the paper is in close contact with the glass, but little of the liquid can flow off between the filter and the sides of the funnel.

Several schemes have at various times been proposed for

opening water-ways between the glass and the paper; the interposition of straws, glass rods and splinters of wood between filter and funnel, as well as fluted funnels and plaited filters are all devices looking to this end.

The advantages of the plaited filter are so great that some chemists prefer to use it, even in quantitative analysis, instead of the common form, in spite of its greater liability to break, and the difficulty of washing the precipitate.

In the laboratory of Profs. Lawrence Smith & Ordway, among the most accurate of American analysts, plaited filters are said to be employed to the almost total exclusion of the plain form.

Another excellent method of increasing the speed of filtration, first suggested in this country by the German chemist, Fleitmann, consists in placing one plain filter within another of coarser fibre; for instance, a fine plain filter of Swedish paper may be placed within another plain filter of coarse German paper, supported, as usual, on a funnel.

In experimenting upon these various forms of filters, it occurred to me to fold the plain qualitative filter in two operations instead of one. In place of folding the filter doubled upon itself down the middle in the usual way, I proposed to turn down on each side of the paper a fold equal to one-quarter of the semi-circle, and then to fold the sectors of 45° arc thus formed back upon themselves.

The filter is then opened without disturbing the folded portions, and placed upon the funnel. In this form the triple side of the plain filter is broken up and the folded portions keep open passages, instead of hindering filtration.

This filter, as tried against the plain form, gave, 1st, 133 : 100. 2d, 111 + : 100. 3d, 205 + : 100.

Two plain filters ran equally in several trials; each was changed into the other's funnel, and No. 1 ran 33 per cent. less than No. 2. No. 1 was dried and folded into my form; remaining in the same funnel, it ran 32 per cent. faster than the other. Both filters were then opened, and showed no tear or weakness when held against the light.

As these filters gave different results in different funnels, I thought I would ascertain the cause. The water seemed to be

retarded in its passage by the attraction of the glass; therefore, those funnels having the greater portion of the paper free from the glass would be the best; that is, *a broad-throated funnel, other things being equal, will filter faster than a narrow-throated funnel.*

To test this point I selected two *large* funnels; No. 1 had three times as broad a throat as No. 2. With the first filters they ran:

117 : 100 123 : 100 133 : 100 118 : 100.

The reason for this low difference was found in a thin spot near the point of No. 2.

Other sets of filters gave:

2d set,	292 : 100	318 : 100	
3d set,	288 : 100	335 : 100	
4th set,	300 : 100	burst.	
5th set,	384 : 100	407 : 100	482 : 100
6th set,	242 : 100		

In the last set a porous filter, though off the same sheet as No. 1, was given to No. 2. Throughout the whole series of experiments every fair advantage was given to the weaker party, it being the first filled and the last emptied.

To make assurance doubly sure, I tried filters in like funnels, stopping the pores of the paper at various points. Paraffin applied whilst liquid was the substance first used to prevent filtration.

Two filters were chosen from the same sheet and of as uniform a texture as possible. No. 1 was stopped over one-third the radius from the point. No. 2, all but one-third the radius at the point.

They filtered at nearly the same rate, No. 1 slightly the faster. The paraffin made the paper stiff, and as water does not adhere to it, free passage was allowed between it and the funnel to the water of the upper part of No. 2.

Here we see that one-ninth of the surface of the filter, when free, did as much work as eight-ninths adherent to the glass. The experiment was repeated with glycerin instead of paraffin. No. 1 ran 28 per cent. the faster. It might be objected that glycerin would wash out; so a pap of paraffin and spirits of turpentine was used to repeat the experiments. Each filter, after

being painted, was wetted to prevent the spread of the mixture by capillary action. The trials were not sufficiently numerous to find a true mean, but the free point invariably ran the most—from 4 or 5 per cent. excess to 100 per cent. The point was assumed to be a circle one-third the radius of the filter.

I understood the idea of the Fleitmann filter to be this, that, likening a plain filter to a peat bed resting upon an impermeable sub-soil, it might be compared to a porous substratum interpolated between the swamp and the clay bottom.

To test this idea a Fleitmann filter was made and wetted, carefully patting down and smoothing out any irregularities. It was tried against a plain filter which was placed in a funnel with but two-thirds as wide a throat as that of the Fleitmann. It ran 114 : 100; that is, the passages kept open by the elasticity of the paper, the creases and abutting edges liken this filter to tile drainage.

To increase the size and number of passages I tried putting the inner filter into a plaited filter of coarse paper. Changing the filters after each trial, I found this form gave the following results as compared with the plain filter, calling the latter one hundred.

1st trial,	184 : 100	4th trial,	66 : 100
2d "	201 : 100	5th "	170 : 100
3d "	250 : 100		

I afterwards found a thin spot in the plain filter of the fourth trial.

Next a precipitate of sulphate of calcium was tried; the filtrates were as 131 : 100. On weighing the precipitates collected they were as 200 : 100.

This form of filter was abandoned, since it does not filter as fast, is not as strong, takes more time to make and care to use than the form next to be described. It is, however, better than the plain filter as regards speed of filtration, equal to the plaited in this respect and stronger than it.

To admit the use of very broad-throated funnels, the number of outside filters was increased to two; these over-coats were pierced with long narrow apertures running from the point to the circumference.

In the following experiments, the improved filter was tried against the *plaited* form. The improved filter, on account of its great strength, was allowed a funnel with a throat once and a half as broad as that given to the plaited filter. It would have borne one three times as broad.

1st trial	121 : 100	3d trial,	112 : 100
2d "	125 : 100	4th "	115 : 100

The fifth trial was made with a precipitate of sulphate of calcium; the filtrates were 82 : 100. Here the new filter seemed at fault, but on weighing the precipitates collected they were as 140 : 100. The new filter being last filled, got the thicker portions each time, while the plaited filter got the weak top liquor.

The outer jacket is cut by folding the filter as a plain filter and taking out a sliver on each edge; repeating the process increases the number of apertures. If the filters are to be used double, as in broad-throated funnels, the openings should extend nearly to the vertex; if they are used single in common funnels the openings need not extend so far, and the extreme point may be removed.

A thick porous felt might be used for acid liquors as an outer filter. Cotton cloth would serve in alkaline solutions; gun cotton could be used with either. If asbestos cloth could be procured it would probably be the best. It might be cleansed by burning, and would be unaffected by anything likely to be filtered in quantitative analysis, nor would it harm the filtrate when estimations are to be made by permanganate of potassium.

Most coarse filter paper is "stuffed" with mineral matter; such paper must of course be leached in acidulated water before being used for quantitative work, where the filtrate is to be saved.

When the precipitate is dry, the outer filters are thrown away, only the fine inner filter being burned.

Plaited and plain filters were tried in like funnels; calling the plaited filters No. 1, we had:

	I. II.		I. II.
1st trial,	116 : 100	3d trial,	236 : 100
2d "	237 : 100	4th "	136 : 100

5th " with sulphate of calcium precipitate, 231 : 100
the precipitates weighed 166 : 100.

I then tried plain filters off the same sheet against each other in like funnels; usually the results varied but a few per cent., though sometimes much more; the greatest difference noticed was 2 to 1; several times the results corresponded exactly on repeated runs of 500 cubic centimetres.

Experiments were made to determine the difference in efficiency between the single and the triple sides of filters. No. 1, had its triple side covered with paraffin, leaving the single side free. No. 2 had the triple side free, while the single was covered; with paraffin the result was 175 : 100; glycerin was then tried with the result 200 : 100, showing the additional paper considerably retarded the flow.

I thought, since the adhesion of the water to the glass is the cause of slow filtration, I might increase the flow by coating the funnels on the inside with paraffin, to which water does not adhere. No. 1, being coated, No. 2, left clean, I got

	I.	II.		I.	II.
1st trial,	200	100	3d trial,	100	100
2d "	84	100	4th "	137	100

The filters in the third and fourth trials were the same, but the funnels were changed about.

The outside or skeleton filters, above described, may be cut the same size as the inner filter; if much smaller the upper part of the inner filter clings to the glass; if larger a part of the precipitate is liable to adhere to the outer filter, and even with great care a part of the precipitate would creep up and be lost.

Boston, Feb. 1868.

ON THE PHYSICAL CHARACTERISTICS OF THE OFFICINAL POWDERS.

By Clemmons Parrish.

[An Inaugural Essay, presented to the Philadelphia College of Pharmacy.]

The new feature of the Pharmacopœia of the United States, by which powders are classified with reference to their degree of fineness, has not, I believe, been the subject of much experiment with a view to determine the actual physical condition of different drugs when brought to the officinal standard of pulverization.

The Pharmacopœia does not indicate whether a powder of a specific grade is designed to be composed of particles of the designated degree of fineness or coarseness, or is intended to be a mixture of all the powders, resulting from the process, which will pass through the prescribed sieve. It could hardly have been designed that the powders, prepared for percolation, should consist of particles of uniform fineness, although, theoretically, this is the object in view. The experiments upon which the statement is based, that a uniform degree of fineness in powders is essential to the most perfect exhaustion by percolation, have, I believe, all been made with powders of uncertain physical composition.

The investigations detailed in this Thesis have been chiefly directed to ascertain the difference between the results of contusion and those of trituration, and are calculated to prove this obvious diversity, and to throw light upon the subject of pulverization generally. In order to make these experiments correspond to the ordinary conditions of the dispensing store, the apparatus employed were, *first*, a quart iron mortar and pestle of ordinary shape; *second*, a small mill of usual construction, such as are sold for domestic use and commonly used in pharmaceutical stores. The sieves were of the five grades prescribed by the Pharmacopœia, viz.: No. 20, No. 40, No. 50, No. 60 and No. 80, having respectively these number of meshes to the linear inch. They were five inches in diameter, with well adjusted top and receptacle of tinned iron. The drugs were, *first*, gentian, suitably dried before weighing; *second*, the inner bark of wild cherry; *third*, decorticated ginger; *fourth*, ergot; *fifth*, Calisaya bark. The contusion was accomplished in the ordinary way, removing the drug from the mortar to the sieve at intervals, say three times, until the whole quantity experimented with passed the coarsest sieve, care being taken to observe uniformity throughout all the experiments; the sifted portions not being returned to the mortar after once passing through the sieve. In the use of the mill the drug was reduced so as to pass through the coarsest sieve by two or three grindings without previous sifting, the larger drugs being first sliced to adapt them to the mill, and the mill being set to the same point for each operation. The method pursued is believed to be that most practiced in the

processes of contusion and grinding as ordinarily accomplished. After obtaining the "coarse powder," U. S. P., passed through the No. 20 sieve, the proportion of the several other grades contained in it was ascertained by successive siftings; in each case the No. 40, No. 50, No. 60 and No. 80 sieves being successively used. The powder passing through No. 40 is the officinal moderately coarse, though containing Nos. 50, 60 and 80 powder; that passing through No. 50 is moderately fine, though containing No. 60 and 80; that passing through No. 60, though fine U. S. P., contains also the very fine, which is not separated until the No. 80 sieve is used.

The results are here tabulated, in the instances of gentian and wild cherry the average of several operations being given; in the others, carefully noted results of one trial:

Table showing the percentage of Powders of the several officinal grades in specimens of "Coarse" (No. 20) Powder, U. S. P.

	No. 20. Average.	No. 40. Average.	No. 50. Average.	No. 60. Average.	No. 80. Average.	Loss. Average.
GENTIAN ROOT.						
Ground	58·0	7·7	5·7	10·1	14.3	4·2
Contused	44·9	12·8	7·1	12·2	20·5	2·5
Swift's Mill	48·0	13·3	9·7	10·2	15·3	3·5
WILD CHERRY BARK.						
Ground	54·4	11·2	9·0	11·0	12·9	1.5
Contused	43·5	8·7	9·6	12·9	22·6	3·7
GINGER ROOT (decorticated.)						
Ground	46·5	26·5	9·8	2·8	1·5	12·9
Contused	49·0	20·5	13·5	5·0	2·0	10·0
ERGOT.						
Ground	81·0	5·8	4·1	2·0	2·5	4·6
Contused	72·1	7·6	6·1	3·8	4·0	6·4
CALISAYA BARK.						
Ground	37·0	25·0	9·1	6·5	21·0	1·3
Contused	17·0	15·0	16·0	14·6	33·3	4·1

It will be seen that the greatest difference in results between grinding and contusion, in the above, is in the case of *Peruvian bark*, the short fibres of which, subjected to grinding, most readily pass into coarse powders, whilst contusion produces a

large proportion of a fine dust which will pass through the No. 80 sieve. If the whole had been subjected to contusion until it would pass the coarsest sieve, a still larger proportion of the finer grades would have been contained in the resulting powder. The ordinary method was, however, adopted in this as in the other experiments, the finer particles being three times separated as the contusion proceeded. Wild cherry gives nearly the same difference, more of the finest powder being produced by contusion at the expense of the coarsest, the intermediate grades differing but little in relative weight.

Ginger, by contusion, seems to increase in the proportion of No. 50 and No. 60 powder; its starchy character probably being unfavorable to its ready reduction to "very fine powder." The loss in ginger is greater than in any of the other experiments, chiefly from the fibre, a portion of which failed to pass the coarsest sieve, and may be called "gruffs."

Ergot, which has a corneous and oily character unfavorable to breaking up into fine dust, gives nearly uniform results by either method, the proportion of fine powder being very small, especially in the triturated specimen.

Gentian, of which the average of several experiments is given, furnishes decided evidence of the general fact that the pestle and mortar are more favorable to the production of the finer grades of powders than the mill. In the single experiment tried with Swift's mill the No. 40 and No. 50 powders were in larger proportion than when the small mill was used, but the No. 60 and No. 80 powders are nearly in the same proportion and decidedly less than the results of contusion.

The Swift's mill is not well adapted to use with so small a quantity of material, on account of the great extent of the rough grinding surfaces.

These experiments, though only conclusive upon the one point of the relative preponderance of the finer powders as the result of contusion, tend to show the great diversity of results by the different means of mechanical division, even when applied to the same drug, and especially when applied to drugs of different structure, and prove that the grades of powder indicated by the

officinal standard are of only approximate uniformity in physical composition.

The still more important inquiry into the chemical and therapeutical composition of the respective grades, as separated by sifting, which would be a difficult though important inquiry, does not enter into the scope of this essay.

CHLORODYNE.

By Edward McInall, Jr.

(An Inaugural Essay, presented to the Philadelphia College of Pharmacy.)

An empirical preparation called chlorodyne, of which so much has been said during the past few years, originated in England, about the year eighteen hundred and sixty. The one claiming to be original was that introduced by Dr. J. Collis Brown, and since its introduction there have been many imitations, both in Europe and the United States. Among some of the English preparations may be mentioned Freeman's Chlorodyne and Towle's Chlorodyne, all purporting to be original articles, but I think that of Brown has the proper claim to originality.

Owing to the cost of importation and indeed its high price on the other side of the Atlantic, many of our Pharmaceutists have been induced to imitate it.

I have examined the many published formulas, but find most of them in a degree impracticable. The Chlorodyne of Brown is a thick viscid mixture, having a strong chloroformic odor combined with the pungency of capsicum, with a greenish hue.

Now the advantage of being syrupy is, I think, entirely unwarranted. The idea of using glycerine or treacle is to unite the morphia and chloroform more intimately together; but what may the need be, if it can be done without.

Another disadvantage in some of these imitations is the use of oil of peppermint. The liability of mistaking chlorodyne for essence of peppermint, as now directed by our Pharmacopœia, at once suggests the abandonment of the use of peppermint as a flavoring ingredient in so powerful a combination. I was led to make, not an imitation of Brown's, but a preparation in which efficacy and practicability were combined. In the

manipulation of pharmaceutical agents it is not imitation so much that should be arrived at, as the correct therapeutical effects.

The mode by which I have made it during the past year is as follows:

Take of Sulphate of Morphia,	grs. lxiv.
Alcohol, 95 per cent.,	f℥ij.
Chloroform Purif.	f℥vj.
Sulphuric Acid,	q. s.
Ext. Cannabis Ind. (Allen's)	ʒss.
Oleoresin of Capsicum,	gtts. xij.
Hydrocyanic Acid, (Scheele's)	gtts. xcvj.

Shake together the sulphate of morphia, alcohol and chloroform, then add the sulphuric acid, shake well until it becomes clear, then add the oleoresin of capsicum, ext. cannabis and hydrocyanic acid.

This, when finished, is a clear, dark green liquid, possessing the acrid taste of capsicum and odor of chloroform. When held to sunlight or artificial light, it has a dark rich claret color. It may be exhibited in doses from fifteen to thirty drops. It has been extensively used by many of our most eminent city practitioners, who prefer it to Brown's in many cases.

I have often heard it stated that one of the principal objections against the use of chlorodyne, is to the fact of it containing ext. cannabis, which, however, appears to be modified in this article by the other constituents.

So much was our preparation admired that, in the space of a year, we had dispensed over one hundred ounces entirely upon prescriptions. There is a preparation made by a leading firm in Philadelphia to which mine corresponds in appearance, but the objection to it is, it deposits a small quantity of morphia upon standing a little time.

I also examined another preparation, made by an assistant of Davenport, the proprietor of Brown's Chlorodyne, which it strongly represents. One serious objection against this was that it was designed to be given in teaspoonful doses. Chlorodyne has become so popular among physicians that, if they should prescribe it, not knowing it was made of this strength, they might be disappointed in its effect. Hence the necessity of having a prepa-

ration uniform in its proportions, and practical in its mode of manipulation.

As a valuable remedy chlorodyne has been highly extolled, and in some instances has acted as a specific in epidemic cholera, which is its principal use. Its other medicinal powers are reputed to be anodyne, diaphoretic, antispasmodic and astringent. In prescribing so powerful a substance, physicians should be perfectly familiar with its dose and other properties. Each teaspoonful contains 1gr. sulph. morphia and about half a grain of ext. Indian hemp, and a drop and a half of Scheele's prussic acid, equal nearly to four drops of U. S. Pharm. acid.

ICE; ITS COLLECTION, STORAGE AND DISTRIBUTION.

By H. T. Cummings, M. D.

This substance, from time immemorial, in the countries of the Eastern Hemisphere, an article of luxury, has become one of prime necessity the world over. It enters into almost every house and place of business, contributing its grateful coolness to the water rendered insipid and tasteless by the fervid heats of summer; it operates, by its antiseptic power, in the preservation of meats, vegetables and fruits in a fresh condition, unchanged by the action of salt or brine; it freezes the creams, and cools the mineral water of the confectioner; and aids the pharmaceutist in the condensation of distillates, the preparation of freezing mixtures, and the cooling of suppositories and ointments, and furnishes a substitute of no mean value for distilled water. So varied and important are its uses, and so valuable is it in the operations conducted in the laboratory of the chemist and pharmaceutist, and so extensive the business and capital concerned in its collection and distribution, that a few notes respecting it have not been deemed as misplaced in this Journal.

Fifty or sixty years ago Mr. Frederic Tudor, of Boston, entered upon the enterprise of exporting ice to the West Indies. He encountered the greatest difficulties in starting the business, among which was one which would bring a smile upon the face of any twelve-year-old boy of to-day. It was as difficult to charter a vessel to carry ice then, as it would be now to get one to carry ni-

tro-glycerin, and he was obliged to purchase the vessel he at first employed, in order to show that ice is a safe cargo. For several years he continued operations in the face of difficulty, discouragement, and pecuniary loss, and it was not until twenty years after that he succeeded in making it remunerative. Since then the business has gradually increased, and within the last twenty years the growth has been very rapid, especially in that department devoted to the supply of the home consumption. The amount of capital employed, and the extent of the ice trade in the United States is something enormous. Full statistics are lacking, but occasional notices appear in the current news of the day, which are extremely suggestive. A communication in the New York *Commercial Advertiser*, written by one who appears to know whereof he affirms, estimates the amount laid up for the consumption of the city trade in 1866 at 580,000 tons; and during the past winter a statement appeared in some of the papers, that there was stored for the consumption of 1868, 750,000 tons. The writer is informed that the Knickerbocker, the largest Ice Company of New York, has a million of dollars invested in the business; and from the statements contained in the communication quoted above, the demand for ice will make room shortly for a dozen more like it. These amounts are independent of all that is invested in this trade, and the ice that is laid up in Philadelphia, Baltimore, Boston, and other large cities of the Union; and a little consideration will show that the ice business in the United States ranks in importance with almost any one that can be named.

The winter just gone has demonstrated that the State of Maine possesses advantages, both of climate and locality, which are eminently favorable to the successful gathering and storing of ice, for both domestic and foreign trade. There are several large rivers in this State where access to the ice fields is easy from the ocean, of which we may name the Saco, the Androscoggin, the Kennebec, the Machias, of which the writer has personal knowledge, and the Penobscot, the Union, the Narraguagus and others, concerning which he cannot speak so definitely as to the convenience of access to their treasures. The correspondent of the New York paper above mentioned speaks of ice

houses on the Hudson more than a hundred miles from New York, and this has suggested Sebago lake, fifteen miles from Portland, a body of water of great purity, containing over fifty square miles, as a source of ice. But while the Kennebec remains practically inexhaustible, with direct access to large vessels from the ocean, the Sebago Lake Ice Bank is unlikely to be drawn upon, on account of the land transportation requisite to render its discounts available. From Augusta down to Merrymeeting Bay, a distance of more than twenty miles, a wide river affords a field which for quantity, quality, and facility of storage, is unequalled, considering its nearness to the ocean. The Saco, the Androscoggin and the Machias possess these same qualities, but in a minor degree.

The past winter has been unusually favorable for the formation of ice of excellent quality, as attested by the magnificent blocks quarried from the "crystal mine," eighteen to twenty-four inches in thickness, and of a purity and hue which seemed as if borrowed from the azure vault of heaven. Some of cerulean blue, and others of diamond clearness and absence of color. The ice this season is veritably of the "first water." The view of the edges of the ice in the Kennebec, along the shores of which the writer had occasion to pass several times during January and February, as it curled up upon encountering the resistance offered by the banks of the river to its expansion, suggested the idea of a fine opportunity to determine, on a large scale, the coefficient of that expansion by those who have the means and the scientific knowledge for the solution of such problems. But enough of preface.

In dealing with the subject on the present occasion, it is proposed to offer a few succinct remarks upon the mode of collecting and storing this commodity, arranging it on board ship for export, leaving the question of statistics to a future opportunity. In doing this, it will be well to follow the order of operations; considering, *first*, ice houses, their size and construction; second, cutting the ice, and the implements used; third, storing it, by one or two of the methods most employed; fourth, exportation, including the preparation of the ship, and the stowage of the cargo, with such particulars as may naturally occur under the divisions named.

1. ICE HOUSES.—These vary in size and capacity from two to fifty thousand tons. Allowing forty cubic feet of ice to the ton, the smaller size mentioned would require internal dimensions of one hundred feet in length, fifty feet in width, and twenty-four feet in height to the eaves. Houses for ten to thirty thousand tons are often built in several sections, of these, or even increased dimensions, giving one the idea of half a dozen large barns cemented together at the sides, each section having its own individual roof, reminding one of the board fences one sometimes sees, where the upper edge of the fence is sawn out into pickets, looking like saw teeth. The capacity of the houses is of course determined by the amount of business the proprietor has, or anticipates. Those examined by the writer are, as a general thing, entirely clear in the interior, no space being taken up by beams or ties, or anything which would interfere with the regular filling up of the whole space with ice, or anything which can possibly act as a heat conductor in the summer season. An interesting problem as to the lateral pressure of the ice is, however, suggested by the occurrence mentioned in the Boston *Journal*, of an ice house in the State of New York bursting from the weight of fifty thousand tons; and another query might be raised as to the construction of the house.

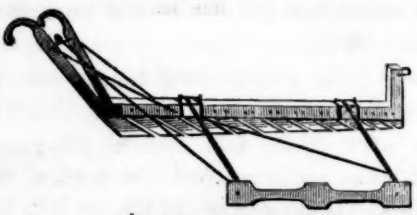
The walls of most ice houses are constructed with a double row of stanchions or studs, the interior ones being perpendicular, and the exterior slightly inclined, so that the space between the boarding may gradually diminish from twenty-four inches at the bottom to sixteen at the top. The boarding is put on between the inner and outer stanchions, to secure it from being burst off by the pressure of the filling, and the inner and outer shells are bound together at regular intervals by iron bolts, to prevent them from spreading apart from the same cause. The space thus left is filled with spent tan preferably, but sawdust may be used, or what are called short shavings. The whole is surmounted by a roof with a steep double pitch, and the building is often whitewashed, roof and all, more perfectly to reflect the rays of the sun. One *sine qua non* is, that all round the foundations the whole building shall be perfectly air-tight; not, as one would at first imagine, to prevent the access of air, but to prevent the

cold air at the bottom from rushing out, and giving up its place to the comparatively warm air at top, which would endanger the whole stock stored in the house. This, with the requisite doors, and hoisting and storing apparatus, may be taken as the general type of a well-constructed ice house.

All the ice houses seen by the writer are constructed entirely above ground; the underground construction having been abandoned, as a general thing, for the reason that during the summer days the earth absorbs the heat of the sun, and does not yield it up at night, so that, continually absorbing heat in this manner, it is believed that the ice wastes more rapidly by underground than above-ground stowage. The writer already quoted, however, speaks of an ice house built of brick, at Cambridge, Mass., which covers 36,000 square feet of ground, its *vaults* forty feet deep, and its walls four feet thick from outside to inside, enclosing two air spaces. From this it would seem that the question is still an open one.

2. Ice Cutting, and the Implements employed.—When the season has been favorable, and the ice has attained the requisite thickness,—the thicker the better,—the ice men proceed to work. As horse power is much employed, and as ice less than five inches in thickness will not bear the weight of a horse, in an open winter it is sometimes late before the ice cutters can commence operations. If there is loose snow upon the surface of the ice, this is removed for any desired distance by means of a scoop, or sometimes merely a plank set on its edge, which is shod with iron. A space of sixty-six feet square will give 108 dozen cakes. If good, clear ice is reached, the work of marking and cutting commences. If the surface of the ice is in that granular condition known as snow ice, the ice plane is required. Previous to its use the hand plow is run along one side of the space in a straight line, to form a groove, which acts as a point of departure, and regulates the motions of all the implements subsequently employed in cutting the ice. These ice implements are sufficiently difficult to describe intelligibly without the aid of a drawing; but let us make the attempt. The snow scraper, or the scoop, is tolerably familiar to all who have had to clear their sidewalks or streets of snow, and need not detain us.

The *hand plow* comes next, as preceding all the others. Let the reader mentally figure to himself a plate of good, tough, well tempered steel, three feet in length, four inches wide at one end, and five and a half inches at the other. The ends are square with the edge, which is uppermost when in use, so that the opposite side alone diverges from a right angle with them. The straight side is strengthened by two bars of iron rivetted on both sides of it, while the other is cut into teeth, by slits, from one-quarter to one-half an inch in width, inclined backwards from the front, and extending entirely up to the stiffening bars above mentioned, so that, when propelled, the teeth present a sharp edge to the ice against which they are pushed, and each tooth being a quarter of an inch deeper than the one which it follows, cuts a groove corresponding in depth, so that the groove made is three and a half inches in depth. To the middle of the upper edge, or what, in analogy with a comb, which it somewhat resembles, might be termed the "back," is attached the handle by which it is pushed forward,—a stiff bar of iron, hinged or rivetted, as the case may be, at the requisite inclination. The lower angle formed by the hinder tooth with the end is usually truncated, thus saving material and weight. [The figure of the large ice-plow will give an idea of the hand plow.—ED.]

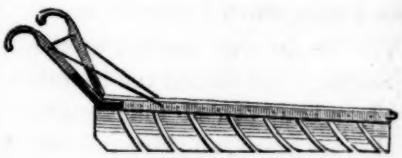


SWING GUIDE MARKER.

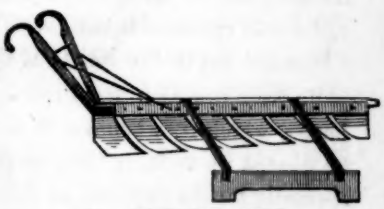
Next comes the *swing guide marker*. This implement differs from the hand plow in being considerably larger, having two handles, similar to those of the tools employed in plowing land, set on to the hinder end of the plow. The swing guide, to which it owes its distinctive appellation, consists of a plate of the same steel as forms the cutting part of the plow, attached by two bars to the back, so that it will run parallel with it at twenty-two inches distance (the width of a cake of ice). These bars are so

hinged that the guide can be swung instantly from one side to the other, and *vice versa*, at the pleasure of the workman. A staple or hook is provided, for attaching a horse. The preliminary groove having been made by the hand plow, the swing guide marker is brought into use, and, the guide taking the groove, the marker makes a second one parallel with it. Upon turning around at the end of the course, the guide is swung over so as to take the groove last made; and on the return trip a third is made. This process is repeated until all the grooves required are made, equally distant from, and parallel with each other.

If the ice is in the condition alluded to in the paragraph headed "*Ice Cutting*, &c.," the ice plane is called into requisition. This consists of a frame formed by two guides, set the normal distance apart, so that they will take the grooves made by the previous instrument. Between these guides is set a strong steel blade, capable of adjustment at the will of the workman, set at an angle like that of a carpenter's plane, and which extends from one to the other. A seat for the driver, and a staple for a whiffle, complete the machine. The shaving trimmed off by this plane is three inches thick, and if clear ice is not reached by once going over the surface, a second, third, and even a fourth planing has occasionally been found necessary; that is, from three to twelve inches in depth has been planed off before sound ice has been reached.



LARGE ICE PLOW.



PLOW AND GUIDE.

The right ice having been reached, the process of *cutting* now commences in good earnest. The hand plow renews its groove, and the swing guide marker follows, until the surface has been marked as before. The large ice plow then follows, and extends the depth of the grooves already made to twelve or fourteen inches. The large ice plow is constructed the same as the hand plow, the difference consisting in its size, the double handles, and

the form of the slits dividing the teeth from each other. These slits are curved, with the concavity looking forwards, so that the teeth are actually sharper than those of the hand plow, as the angles between the lower edge and each slit are much more acute. The same operation is repeated now at right angles to the former grooves, and the cakes are ready for separation from each other. The mode of effecting this is probably not uniform. In this city, the largest dealer commences by sawing out one outside row of the blocks, and another adjacent and at right angles to the first. The rows thus cut are slightly bevelled, narrower below than at the top. Before doing this, however, it is necessary to take measures to prevent the water from entering the grooves and freezing therein, thus filling them up. This is done by caulking them with snow, and this is done with an instrument called the *caulking bar*, a bar with a broad chisel-like end, and so made as to enter the grooves, and drive the snow to the very bottom. The two outside rows having been sawed out, the blocks lifted upon the adjacent ice, and the grooves behind the next row of blocks having been caulked as before, a bar called the *breaking bar* is used, generally in pairs, to pry the blocks apart, giving double the purchase attainable with a single one. The caulking process must be used behind every row of blocks to be separated, else the plowing would, on one of our freezing days, prove a Sysiphæan labor, having to be repeated again and again *ad infinitum*. The blocks are now floated, through a channel cut in the ice, to the ice house, which brings us to

3. STORING AND PACKING.—The blocks once arrived at the house, which is, whenever it is possible, built so that the ice can be floated up to it, is then seized by a huge pair of tongs made specially for the purpose, as the cakes are heavy, weighing three or four hundred pounds apiece, and hoisted up at once where they are wanted. The ice is disposed in regular tiers, the blocks being placed as closely together as possible, though no particular pains is taken to fill up the interstices. This proceeds until the house is filled. One of the most important particulars relates to the covering over all. The material preferred before all others is the long pine shavings of the carpenters. These are cleanly, durable, and not subject to decay, are easily handled with a com-

mon pitchfork, and may be used for more than one filling of the house. The objection to hay or straw is that it is liable to decay, and becomes musty. Sawdust is disagreeable, from constantly sifting down and covering the cakes of the successive tiers, as the upper ones are removed.

One mode of raising the ice from the water, which is considerably practised, is by means of a steam engine operating a species of endless chain. One ice house, situated at the head of navigation on the Saco River, has this apparatus, raising the cakes to the top of an inclined plane, and sending them down another, of half a mile in length, to the house. It is somewhat interesting to note the cakes ascending the slip, and then starting off, as it were, automatically, on their travels for the ice house. As they reach the final incline they encounter the provisions made for checking their momentum. These consist of a series of heavy planks, one end of which is suspended above the track, and the other rests upon it. As the cakes of ice come rushing down the incline, they pass under the suspended end of the plank, and meet the other end, which must be lifted before they can pass. So great is the momentum they acquire, that three of such checks are scarcely sufficient to arrest their motion, and as they enter the house they meet another plank arranged in the same way, but with the addition of a long lever, operated by two men. The ice enters the house at the middle of the side of the first section, and the momentum remaining, after passing three of the planks, is sufficient to carry it through four sections of the house into the fifth, a distance of over two hundred feet. Neither time nor space will admit of details as to the ingenious arrangements for turning it to the right or left in all the sections, but the whole thing is so arranged that the cakes are under complete control, and with ordinary care no accident need occur.

The houses being filled, the proprietors await the summer demand for their commodity, or else proceed at once to load up for tropical markets. The ice which is stored commences to melt at the upper tier, and here is where the greatest waste occurs. The resulting water, percolating through the interstices of the ice, reaches the lower tiers, and, finding a temperature below its freezing point, congeals again, cementing the cakes together in

the lower tiers so as finally to form a solid mass, if left undisturbed for a sufficient length of time. An ice house in this city was filled, and left undisturbed for four years. During the fifth year the proprietor, finding his stock of ice running low, examined this house, and found that, by melting, the ice had lowered from twenty feet to four feet in height, and was one solid cake. He was compelled to employ his plows, and get the ice out of it in such pieces as he could; but it carried him through the season.

4. EXPORTATION.—In the first part of the present paper allusion has been made to the difficulties encountered in the earlier efforts to transport ice to southern and eastern markets. The first cargo was despatched by Mr. Tudor in February, 1806, to St. Pierre, Martinique. He shipped about 130 tons, and of this only *five* tons arrived at its destination; and this trip was attended with a loss of about $4,500. Details of the different expedients resorted to to avoid this loss would be interesting, but the mention of one must suffice. On one occasion he purchased several large cases of flannels, and endeavored by winding the pieces in and out and around the ice, to protect it from its natural enemy, a high temperature; but this expedient proved unsuccessful. At length, as ice houses were erected, and the correct principles for their construction were gradually developed, it became apparent that the same principles must obtain in preparing a ship to carry a cargo of ice,—converting it, in fact, into a floating ice house; and this is the way it is now done.

The first thing is to make an even floor in the hold of the ship, by filling up the furrows, so to speak, each side of the keel, with what sailors term "*dunnage*," consisting of fragments of lumber or ballast of some kind. This gives a tolerably wide floor for the lower tier of ice, which (the floor, not the ice) is covered with a layer of straw or hay, and this again with a thin layer of coarse sawdust or wood turnings. This allows the water from the melting ice to trickle down, and to be removed by the pumps. But as the space at the bow and stern of the ship is necessarily narrow, and would admit of the packing of but one cake of ice in the extreme parts of it, which would be attended with great loss and waste without any compensating advantages, it has been found

necessary to erect partitions, or bulkheads, across such parts of the vessel as its particular model shall render advisable, so that from half to two-thirds of all the available space in the ship shall be occupied by the cargo, equidistant between bow and stern. This done, the ship is prepared to receive her cargo.

Moored at the wharf where the ice is to be delivered, the main hatch is thrown open, and a slide or "chute" is constructed from the landing to the hatch. In some cases this "chute" is laid directly from the ice house to the vessel, in others transportation by teams may be necessary. Over the hatchway a windlass is erected, the drum extending entirely across it lengthwise. To this are suspended two "gigs," or iron frames intended to receive the cakes of ice from the "chute," in such a manner as that, while the loaded one descends, the empty one rises. As the cakes of ice come rushing down the chute, they are dexterously directed by the ice-hooks in the hands of the workmen to one side or the other, so as to enter the gigs, which descend with them into the hold. As the lower tier is completed, it is packed all round the sides of the vessel with sawdust. This gives additional space for the next tier, which is wider than the first, as the sides of the vessel recede from the keel; and the tiers, increasing in width until the whole breadth of beam of the ship is attained, are successively packed as described.

In the shipping of ice immense quantities of sawdust are used, so that what the owners of saw-mills used to be bothered with to get rid of, now yields them a handsome revenue. It is estimated that the ice trade of Boston alone consumes sawdust, shavings and rice chaff to the value of $30,000 a year, an item which used to be thrown away. This is suggestive in connection with the injury done to the navigation of the Penobscot river, in this State, by the sawdust, edgings, and other refuse of the mills, which have accumulated in the bed of the river below Bangor. The inquiry would be worth an answer, whether it would not pay in part for the expense of recovering the sawdust, and other material, to dry and sell it. A greatly needed public improvement, it would seem, might be effected at a comparatively small cost to the government. The whole results of the dredging might be made available, partly in this way, and partly as a natural fertilizer of the best quality.

To deliver a cargo of ice to India involves a voyage of sixteen thousand miles, occupying four or five months, during which the equator is crossed twice; and if one-half the cargo is delivered it is regarded as a success. The loss, is, however, sometimes much greater, even amounting to 75 per cent. On shorter voyages, such as the West Indies, and the southern part of the United States, the loss will not often exceed 33 per cent. of the amount shipped.

It would seem that ice, costing nothing for the raw material, might be furnished at lower rates than is demanded for it; but when the amount of capital and labor employed, in houses, men, teams, horses, tools and machinery, are taken into the account, together with the greatly advanced cost of every item which enters into the business, it will be at once seen that only the utmost care and the most perfect appliances can render operations remunerative enough to induce capitalists to invest their funds, and allow them to continue thus appropriated.

The few remarks thus offered on the subject imperfectly shadow forth one side of this immense department of labor and trade. Northern New England, and Maine especially, has a grand future open before her in this line of commerce. The demand will never diminish, and we may look for a gradual and steady increase, which will make large drafts npon our rivers and lakes. Though for a large part of the year New England is in the "cold," she has summer enough for flowers, fruits and food, and the products of her Arctic season extend their refreshing influences to climes which if in some respects they may be called more favored, in others leave the question open, as to their being so much more to be preferred. Let us borrow the words of the Physician-Poet of the Old Bay State.

"New England! proudly may thy children claim
Their honored birthright by its humblest name!
Cold are thy skies, but ever fresh and clear,
No rank malaria stains thine atmosphere;
No fungous weeds invade thy scanty soil,
Scarred by the ploughshare of unslumbering toil.
Long may the doctrines by thy sages taught,
Raised from the quarries where their sires have wrought,
Be like the granite of thy rock-ribbed land—

As slow to rear, as obdurate to stand;
And as the ice that leaves thy crystal mine
Chills the fierce alcohol in the Creole's wine,
So may the doctrines of thy sober school
Keep the hot theories of thy neighbors cool!"

Portland, Maine, April, 1868.

ON SUPPOSITORIES.

By J. B. Moore.

Suppositories have, within the last few years, become very important and popular therapeutic agents with the medical profession, and I am only surprised that they are not more extensively and generally prescribed, considering the vast number of cases to which they would be applicable and so highly useful. The demand for them, however, is daily increasing, which renders a thorough acquaintance with the subject of their manufacture one of no little importance to the pharmacist who desires to keep pace with the progress of improvements constantly going on in his profession; and as I have given the matter some attention, I have therefore concluded to give my views and experience upon the subject; and if the hints or suggestions which I shall offer shall prove upon practical application to be of any value to my brethren in the profession, in enabling them to surmount any of the difficulties heretofore attending their manufacture, I shall feel gratified.

In the first place I would state that I use the ordinary metal mould. Those for the rectum I have of three sizes, holding respectively fifteen, twenty-five, and thirty-five grains each of the butter of cacao; the smallest size for children, and the larger for adults. For vaginal suppositories or pessaries I use but one size, which is of two drachms capacity. Preparatory to filling the moulds, I *coat* their inner surface with *finely-dusted* arrowroot or lycopodium, which *effectually* prevents the suppositories, when properly chilled, from adhering to the moulds, which they will otherwise do, and frequently with such tenacity as to render it impossible to dislodge them without warming the mould, which often destroys the beauty of the suppositories, and leaves the moulds in a soiled and greasy condition, troublesome to clean.

I then prepare a *refrigerating* vessel, in the following manner: I fill a pan or dish, or other suitable vessel, with finely broken ice, or water in which a piece of ice is immersed, in which I place the requisite number of moulds, held in their position by a perforated sheet of heavy tin; or, if this is not at hand, a piece of *stiff* pasteboard, or a thick paper box lid with perforations adapted to the size of the moulds, will answer the purpose *temporarily*. But where the apothecary has a large demand for suppositories, and is required to make them frequently and in large quantities, it would be perhaps, if not more convenient, at least more business-like to have a *tin tray*, with perforated lid, for the purpose, which can be had made to order at almost any tinsmith's, for from fifty cents to one dollar.

After the *refrigerating* vessel is prepared and in readiness, and the moulds properly coated, then proceed to prepare and mix the ingredients. In preparing powdered substances for suppositories, they should be brought to as *minute* a state of division as it is possible to reduce them, before admixture with the *excipient*. If this desired state of tenuity cannot be attained without too much time and labor, by process of powdering, the material, if soluble or miscible in water, glycerin or olive oil, may be triturated with a few drops of either liquid until a perfectly smooth and uniform pasty mixture is obtained, although I have rarely found the addition necessary; and suppositories made without the addition of water are usually firmer, and generally more elegant in appearance, more permanent, and less disposed to undergo change of color or decomposition in any of their constituents by time.

If the active ingredient be an extract, and it is in good pilular condition, it needs no further preparation, except thorough trituration *alone* in a mortar, until all rough particles are extinguished, and it has become *perfectly* smooth; but should it have become dry and hard by exposure and neglect, it must be reduced to an *even* pasty consistence, by first working it up well with a few drops of water between the fingers, as the warmth of the hand greatly facilitates the softening of the mass and its admixture with the water. After being thus partially softened, the process may be completed in a mortar.

Alcohol should never be used in the manufacture of suppositories where it can be avoided, on account of its stimulating properties. If ever absolutely necessary in softening resinous substances, as small a portion as possible to effect the object should be employed.

When the medicinal ingredients are duly prepared as above directed, they are then to be *well rubbed in a mortar* with a small portion of the *excipient*, until thoroughly and uniformly mixed; then the remainder of the latter is *gradually* added, and the whole well beat up and incorporated together, as in making pill-mass. This being accomplished, the mixture is transferred to a *capsule* or other suitable vessel, and heated by means of a water-bath at a temperature of about 100°, or not exceeding 120°, with constant stirring during liquefaction, until melted, and a perfectly homogenous mixture is obtained, which should be allowed to cool, and, during refrigeration, to be well stirred until it approaches nearly the consistence of molasses, or as thick a condition as it can be brought, to admit of being poured into the moulds without inconvenience. In this state it will hold the medicinal ingredients in suspension better, and prevent them from settling to the bottom of the moulds, than when more fluid, and thereby insure a more uniform diffusion of the active ingredients throughout the suppositories, which is so important, especially when very powerful or active substances are among the ingredients used. Every care should be exercised to give to each suppository its equal share of activity, and have it equably distributed throughout its substance, in order that, when applied, every part of the mucous membrane with which it may come in contact may receive its *due share* of medication, and which will also facilitate *absorption.*

After the moulds have been placed in their position in the refrigerating vessel, and have remained there about five minutes, or long enough to have become ice-cold or nearly so, the mixture, after being prepared as above directed, may be carefully poured into them, observing to stir it occasionally during the operation; and should it chill too much, and become inconvenient to pour, it must be restored to the proper fluidity by *very gently* warming it again.

The suppositories, after having become sufficiently cold and firm, may be easily removed from the moulds by the gentlest tap of the edge of the latter upon the counter; in fact, the greater number will drop out by simply inverting the mould. Should any of the coating adhere to the suppository after its *delivery*, and should be objectionable, it may be removed with a soft brush or raw cotton.

By this simple expedient of *coating* the moulds with an inert powder, they are made to *deliver* with the greatest facility, which overcomes the greatest difficulty, and effectually removes the most troublesome and annoying feature which most apothecaries have heretofore had to encounter in the manufacture of suppositories. When I first began to have a demand for them, about seven years ago, it was seldom that I had occasion to make them, but at every attempt I was invariably vexed by their persistent adherence to the moulds. So great and annoying was this impediment to the process, that I became completely disgusted with it, and there was nothing that I so much dreaded as to receive a prescription for them, particularly when at a busy hour of the day, and the customer, perhaps, *impatient*. But as the demand increased, and the occasion to prepare them became of more frequent occurrence, I felt compelled to devise some means to remove the difficulty, and after resorting to various methods without avail, I tried the above plan, which I have ever since adopted with uniform and gratifying success. I have communicated the idea to many of my friends in the profession, whose experience coincides with my own.

The method also proposed above, of directly incorporating the medicinal ingredients with the excipient in a mortar, instead of with the latter in liquid state, which is the plan usually adopted, will be found upon trial to possess many advantages. By this latter method good suppositories cannot be made with some substances without unnecessary trouble. Liquor ferri subsulphatis, for instance, when added to melted cacao butter, is not readily miscible, whereas, when incorporated with it mechanically, it afterwards makes, when liquified, a perfectly homogeneous mixture, and shows less tendency to separate. Many instances of this character might be mentioned.

Physicians occasionally prescribe medicines in suppositories which are chemically, if not medicinally, incompatible, especially when mixed together in the presence of moisture. In all such cases the ingredients should each be rubbed *separately* with small portions of the excipient, and then all thoroughly incorporated together with the remainder. The particles of each ingredient thus become separately enveloped in the oily vehicle, and are not only less prone to react upon each other, but do not evince the same tendency to separate and deposit after the mixture is liquified, as when mixed together with water and added to the excipient in the state of fusion. In making suppositories of tannic acid, sugar of lead, and opium, in combination, this method has, I think, peculiar advantages. This plan will also apply to all other combinations of a similar character.

Some druggists, I understand, are in the habit of keeping on hand a supply of plain or unmedicated suppositories of cacao butter, and when they receive a prescription for suppositories they make an opening in the base of the former, in which they introduce the medicinal ingredient and close the aperture. This unpharmaceutical and reprehensible practice should not be countenanced or tolerated by the medical profession.

The bland nature of the butter of cacao, together with its proper consistence, and fusibility at the temperature of the body, seem to pre-eminently fit it as an excipient for suppositories, in preference to any other known substance.

From about the first of October until about the first of June I use it *alone;* and during the remainder of the year I usually add to it a small portion of wax. The exact quantity of which necessary to use in all cases cannot be named, as that will depend altogether upon the temperature of the season, and the nature and quantity of the added ingredients. For instance, if the latter be a light absorbent powder, such as galls, tannic acid, &c., and in large quantity, little or no wax will be necessary even in hot summer weather; whereas, if a soft extract or other soft material be added, a small portion of wax will be requisite, in the addition of which the operator must be guided entirely by his own judgment; and care must be taken not to add too much, or it will render the suppository too hard and infusible in the rec-

tum, exciting irritation. I have known this to be the case in more than one instance.

The greater number of the suppository moulds which I have met with in the market seem to have been very carelessly made, not unfrequently having deep scratches and other defects in them; therefore care should be taken, in purchasing moulds, to select those which have a smooth and uniform surface, and as free from defects as possible, otherwise they will disfigure and impart a rough and inelegant appearance to the suppository, which will be very mortifying to the operator, who perhaps has taken special pains, with every step of the process, to secure a handsome result, but finds his best efforts in vain. The coating will frequently, to some extent, remedy this difficulty by filling up *slight* defects or inequalities in the moulds.

The *exact capacity* of each set of moulds should be known before attempting to use them, which can be easily ascertained by preparing, in one mould of each set, a plain suppository of cacao butter, and weighing it. Then, in weighing out the excipient for any given number of suppositories, make as nearly as possible proper allowance for the bulk of the medicinal ingredients. There will then be less risk of adding too much of the excipient, and having a portion of the mixture left over after the requisite number of moulds have been filled, which ought to be assiduously avoided, but which will sometimes happen unless the above precaution is observed. If the medicinal ingredients are not bulky, or not in large quantity, scarcely any allowance for their bulk will be necessary; such is the case if morphia, opium, extracts of belladonna, cannabis indica, or many other active remedies which might be named, are prescribed.

Either rectal or vaginal suppositories, of any size, can be made with equal facility by the above process and manipulation. The time required to make a dozen suppositories, under ordinary circumstances, is about thirty minutes; but when *dispatch* is necessary, they *can* be prepared and ready to deliver to the customer in from twenty to twenty-five minutes, when every appliance is at hand. But when it can be afforded, ample time should be allowed for them to remain in the refrigerating vessel to become perfectly hard, so as to admit of all necessary handling

without melting between the fingers,—say in winter from five to ten minutes, and in summer from fifteen to twenty minutes.

When properly made, suppositories should have no depression in their base, as it is almost an *infallible* indication that the mixture has not been sufficiently cooled before being poured into the mould. This depression is caused by the shrinking of the mass upon cooling.

The *modus operandi* proposed in this paper for the manufacture of suppositories, is such as I have adopted and thoroughly tested for the last six or seven years, with unvarying success; and the general directions with regard to manipulation will apply to most substances; but there are others, such as the gum-resins, oleo-resins, oils, balsams, &c., which will require *special* preparatory treatment before they can be readily made into suppositories, which will sometimes test not only the skill and ingenuity, but the patience of the pharmacist to no small degree. These I propose to make the subject of another essay.

Philadelphia, April, 1868.

BOTANY IN ITS BEARINGS ON PHARMACY.—BOTANICAL GARDENS.

By the Editor.

This is the season for botanical studies, nature is rapidly putting on her garb of beauty after a long winter of unusual severity, and we are pleased to observe that several courses of Lectures on botany have been announced. It is curious that this science, so important to the pharmaceutist, should be so difficult to engraft on his attention. After more than forty years existence our College of Pharmacy has not been able to establish a permanent botanical chair, and this apathy is largely due to the want of an instructional garden where teachers might resort with their classes. At this time Prof. Maisch is giving a gratuitous course to the students of the College, with weekly excursions, and it is to be hoped that ere long botany will become as much a part of the curriculum as chemistry. *Philadelphia needs a botanical garden and arboretum, under the direction of the Academy of Natural Sciences.*

Thirty-five years ago the garden of "good old John Bartram, the King's Botanist," was in existence on the right bank of the Schuylkill, below Gray's Ferry (Philada.); and many a time, when an apprentice, have we walked there to gather information, and to enjoy the shady avenues of that most interesting spot, hallowed as it was by the numerous evidences of his industry, ingenuity and perseverance, and by the noble

specimens of his planting which, on every side, stood as monuments to his memory. The only specimen of spigelia our herbarium contained was gathered there, by permission, and numerous indigenous plants, not found in the neighboring flora, there had a dwelling place. This garden yet exists in private hands, but it has long ceased to be a teacher, and, so far as we know, it has no successor. A city of 600,000 inhabitants without a botanical garden! Such a thing in Europe is unheard of, and would not be understood. It is true our professed gardeners have gardens, some of them, with well laid lawns, noble evergreens, exquisite hedges, and green-houses stored with floral beauties; but where are the indigenous annuals or perennial herbaceous plants so numerously scattered over our country? Where can we go as students, to illustrate the natural orders of plants in a living, blooming page, where side by side the several species of a genus may be examined? Alas! nowhere in this vicinity, and, unless in Prof. Gray's garden at Cambridge, we cannot recall a single instance. The industrial gardens of the Shakers, whose efforts are almost solely in the direction of medicinal plants, are without any regard to their scientific relationships.

It may be asked of what use are botanical gardens, except as ornamental appendages to a great city, where the people may resort to pass an idle hour, and admire the exterior beauty of flowers, shrubs and trees? and why may not our parks be botanical gardens? In reply, it may be said that they should, in one sense, be rendered subservient to the culture of a taste for botany. All such trees and shrubs as are available in these public resorts should be distinctly and permanently labelled with the scientific name, and at least one common name, that even the thoughtless and careless may glean as they pass; a germ of earnest action might thus be awakened, by so casual an opportunity to be face to face with the names of these mute representatives of the vegetable kingdom, in the mind of some youthful Linnæus or De Candolle. But this is not what we are aiming at. We want a garden where plants are grown under the auspices of a scientific director, by competent gardeners,—not for sale, not for their beauty merely, but for the illustration of botanical science as a field of study, where, on fitting occasions, our medical and pharmaceutical students may make the acquaintance of those numerous species and important genera on which the sciences of medicine and pharmacy so largely rest,—where the advanced scholars of our public and private schools could resort with their teachers in reasonable numbers, and, under proper regulations, to watch the evolution of plants from blooming to fruition; and where a judicious running discourse, in connection with previous studies, would impress an interest in the unseen beauties of botany, which, more than glaring floral colors, will retain advocates for the science.

Our country is rich in botanical treasures; its indigenous materia medica is extensive and important, but with few exceptions the market is supplied wholly from the natural growth of our woods and uncultivated lands. Already some, as spigelia, senega and serpentaria, have retired

far to the west and south, and but for the Sabbath which these lands have had through the direful hands of war, even these sources may have been weakened. To what, then, are we to look for the future supply? How much seed of these plants, for instance, could be found in our seed stores? We venture to say, not an ounce. Yet on their culture must depend the supply of the far future, and it is time that our industrial gardeners, the Shakers, should study practically the problem, and determine how far these and other important indigenous drugs may submit to culture, by studying their habits in the garden. Already Valeriana officinalis is becoming a staple of New England. Why should not the sunny slopes of Tennessee and upper Georgia respond to labor, and produce spigelia and the snake roots? The threatened extirpation of the cinchonas by the recklessness of the cascarilleros has awakened the action of nations to repair the danger. Jalap now demands, and is receiving, similar attention; and Dr. Hooker, in his last report from Kew, speaks of efforts being made to render the supply of columbo more equable, by its introduction and culture in the British colonies.

During the spring and summer of 1867, an opportunity offered to look in on several of the botanical gardens of Europe; beginning with Paris, these were at Naples, Zurich, Munich, Vienna, Dresden, Amsterdam, Brussels, London and Edinburgh. Those of many other cities were passed by for want of time. In all of these the adaptation to scientific study was apparent in the grouping, and whilst hardly any two of them were alike in locality, or in details, they all in greater or less degree accomplished the object of their creation,—viz., the promotion of science by exhibiting living individuals of widely spread genera; and as the seed are carefully saved for distribution, correspondence is kept up among the directors, who are generally professors of eminence in botanical science. The Garden of Plants, as it is called, at Paris, embraces living zoological and botanical collections, as well as museums of zoology and comparative anatomy, and herbariums, and is one vast concentration of scientific material and talent, where every known form of organic life is studied, living or dead. But it is only with its relations as a botanical garden that it is here called in for notice. The "Jardin des Plantes," situated on the south side of the Seine, in the south-east portion of Paris, occupies about 35 acres in all. It lies contiguous to the Ecole de Medicine and the Ecole de Pharmacie, the students of which may have daily access to its borders. The streets which surround it are named from naturalists: Rue Cuvier, Rue Jeffroy St. Hillaire, and Rue de Buffon. The portion devoted to the culture of annuals and herbaceous perennials is laid out in squares, and enclosed with low fencing. The beds are carefully kept, and every species is duly labelled in a way to aid the visitor. The medicinal plants have *red* labels, alimentary plants *green* labels, *blue* those used in the arts, *yellow* for ornamental, and *black* for poisonous plants. It is open at certain hours every day, and all classes of people visit it; some to sit beneath the shady trees to enjoy a passing

hour, others to study the plants, whilst very many others are attracted by the menageries situated on the northern side, and which are interspersed among trees and shrubbery in a way at once adding to the comfort of the animals, and the interest and beauty of the arrangements, which are very extensive. Within the grounds, which are enclosed with a high iron railing, are two artificial mounds or hills, one called the Labyrinth, covered with trees, shrubbery, and intricate paths. There is a cedar of Lebanon 134 years old, sent from England by Collinson, which is now nearly four feet in diameter five feet from the ground, and was planted by the elder Jussieu. From the top of this mound a fine view is had to the north and east. The western hill is an arboretum of evergreens embracing a large number of species, and at its southern base is an enclosure where many valuable exotics from Australia, the Cape, and Africa, are kept in warm weather. Nearly 12,000 species are under culture in the garden, and between nine and ten thousand packages of seeds, and nearly as many young trees, are distributed annually to professional hands for culture. On our first visit, in May, the bedded plants were just coming out. Afterwards, in August, almost a drouth prevailed; many of the trees were losing their leaves, and the whole garden had a dingy and dusty aspect, in consequence of the dry weather. The annual expenses are over $100,000.

The garden at Naples is located on Strada Foria, near the poor-house. It has an excellent collection of trees and shrubs, among which many of our own were noticed with pleasure,—several fine magnolias among them. It is rich in Australian plants, many of which were in bloom, and many intra-tropical trees, including palms; but the garden is badly supplied with water, and at that time dry weather prevailed. The garden is moderate in dimensions, and does not possess very great accommodations under glass. The borders were, however, neatly laid out, and in good order; but it was too early in the season for much display of annuals.

The garden at Berne is new, and under the auspices of the University, Prof. Fischer being the director. It is situated on the north-west side of the city, beyond the Aare, is protected by the railway embankment and has a southern exposure. It is managed with evident interest and energy, and presents many features deserving of notice, among which a pond for aquatic plants may be instanced. Its isolated position, however, causes it to be less frequented by the public than some other gardens.

The space devoted to a botanical garden at Zurich is on the north-western side of the city, but within its borders. It is not extensive, but includes several green-houses of moderate dimensions. There is an elevation or mound within the enclosure, called the Katz, planted with lime trees on the summit, and shrubbery, etc., on the sides, which was, we believe, formerly a fortification. Several monumental busts of botanists are erected in the grounds. The impression made by this garden was not as

favorable as that at Berne; yet there were many exotics, and much to interest the visitor.

At Munich the botanical garden is within the western central portion of the city, one side resting on Karls Platz. It is in the shape of a semicircle, surrounded by streets, enclosed in a railing, with the green houses on the top of the arc, which is towards the north. A large portion is devoted to annuals and herbaceous plants. The supervision of this garden appears to be excellent; everything is in order and well kept, and yet it is almost as much a resort as our public squares. Nurses take their children and sit under the trees; women, with their knitting and sewing, tarry there to enjoy the place, whilst they reflect or gossip, as the case may be. The beds are rectangular, and the plants duly labelled; and students can be seen pursuing their studies. Water is supplied from an open cistern. The shrubbery is arranged around the outer grounds, so as to protect the gardens from winds.

One of the best arranged and most extensive botanical gardens met with in Germany is that at Vienna. It is situated in the eastern suburb of that city, adjacent to the Belvedere, opening on the Renweg-gasse, and, in connection with the extensive ornamented grounds between the old and new Belvederes, which lie beside it, constitutes a plot of many acres in extent. The ground has a gentle inclination towards the west, and is laid out with much less formality than most gardens, the prevailing lines being curves, and a perfect contrast to that of the Belvedere gardens. The variety of trees is quite extensive, many of them American; the higher grounds being given to the arboretum and shrubbery, whilst the portions towards the west, nearer to the front, are beautifully arranged in beds of various shapes, with intervening walks. The beds are of such size that many of them contain only a single genus, as the rhubarbs, the aconites, the lobelias, the mints, etc. The medical plants occupy a special department, which renders them very easy of study, and to medical and pharmaceutical students a great advantage Seats are placed at intervals, the shade being chosen in their location, especially in the upper parts.

The botanical garden at Dresden is small, not far from the palace grounds, but appears to be well stocked, and offers a considerable variety of plants, chiefly annual and herbaceous, as there is not space for trees and shrubbery but to a limited extent.

The culture of flowers as ornaments to public and private gardens is carried to great perfection in Southern Germany. The Volks Garten, in Vienna, in the month of July, 1867, presented a most pleasing spectacle. The winding walks were between beds of the most beautiful flowers, in which the prevailing colors were arranged so perfectly that at a short distance one might fancy it the work of the painter; for the plants are so uniform in size and color, and grow so close, as to present only their beautiful corollas to the view. The small blue lobelia, the wall flower, the heliotrope, the pansy, and various others; and so perfect is the respect

for law and property, that they are seldom disturbed by the numerous companies of children who frequent the gardens,—a feature that seems to prevail in continental Europe, and which renders the ornamenting of public grounds easy. The art of gardening is carried to much greater perfection in Europe than with us, and this is shown in no way more forcibly than in the perfect mastery the gardener possesses in shaping trees and shrubs by pruning. Trees are shortened-in in various ways, and it is not uncommon to observe in the public walks trees, the trunks of which are more than a foot in diameter, forced to extend their branches horizontally, so as to make a continuous shade, at the expense of their height. The oriental plane tree, closely analagous in its habits to our sycamore, and the same genus (Platanus), is thus compelled to abandon its ascending habit, and make a lateral growth in the public promenade, so as to get shade without offering much impediment to the wind. The locust (Robinia), both the European and American species, and the white mulberry, are pollarded to great advantage for ornament and shade.

In no instance have we noticed more important results than in the admirable use to which our Virginia Creeper (Ampelopsis virg.) is put, as a cover for screens. It grows luxuriantly, and covers an open upright trellis-work so perfectly as to render it impervious to sight. Screens of this kind are very common in Bavaria and other portions of southern Germany, at railroad stations, near the detached offices. There is also great attention given by railroad officials to the banks, both of cuttings and artificial embankments, to get them in sod; and where the soil is treacherous, and tends to cave, trees with strong running roots, like the yellow locust, are encouraged to grow in some districts. Flower gardens are often made on the banks at the less important stations, and on several occasions the name of the station, in well-formed letters composed wholly of flowers of some bright color, was observed in the well-shorn sod of the banks.

Of course this artificial training is not advocated for parks and other public grounds where space for expansion exists; but where trees must be headed in, it is vastly better to do it systematically, so as to dwarf their tops, than by the unreasonable and unsightly amputations and decapitations which our professed (!) tree-trimmers resort to annually, to disfigure our streets with monuments to their ignorance and stupidity.

The garden at Amsterdam, on the southern side of that city, is of moderate extent, and adjacent to the Zoological Gardens. The existence of such places of scientific culture in so confined a city as Amsterdam, and among so utilitarian a people, shows the general habit of European authorities to encourage such means of attaining knowledge and amusement.

The garden at Brussels is a pentagonal space, completely surrounded by the built-up portions of the city, the longest side of which is on Boulevard de Jardin Botanique. A range of green-houses occupy the highest, or northern side, and the open garden and shrubbery is tastefully laid out

in walks and beds,—the eastern end like our Washington Square, the western end less formally. It is much resorted to by the population, and is well kept.

But all these gardens are greatly inferior in extent to those of Kew, near London, which are appropriately named the Royal Gardens, as the whole establishment is supported on the most liberal scale by the Government. Situated on the banks of the Thames, about thirteen miles above London, they have long been under the supervision of eminent botanists, and especially since 1841, when Sir William J. Hooker assumed the directorship, succeeded in 1865 by his son, Dr. Joseph D. Hooker, the present Director. Originally a part of the grounds of Kew palace, eleven acres in extent, the gardens have been enlarged by grant after grant, until at present the scientific portion of the ground embraces 75 acres, adjacent to which are the "pleasure grounds or arboretum," of 270 acres, and other extensive parks. The buildings for botanical purposes are on the most extensive scale. The largest of these is the palm house, or "stove," as it is called, completed in 1848. It is 362 feet long, 100 feet wide in the centre, and 62 feet high. It is constructed of iron work and glass mainly, and contains 45,000 square feet of glazing, has a gallery 30 feet high for visitors to view the palms from above, is heated by hot water by means of tanks and pipes, of which about 24,000 feet are used in the building, distributed under the shelves and floor, and operated by means of vast furnaces under the building, the flues of which are carried underground 500 feet to a stack of chimnies in the square tower, a structure connected with the water supply of the gardens. In this fine building one needs help of but little imagination to fancy himself in the tropics, so completely is the equatorial flora represented. The cocoanut palm, the betel nut, the date palm, the palm oil tree of Africa, the ivory nut tree of New Grenada, the banana and plantain, the bamboo, the banyan fig, the tamarind, the coffee, allspice, pepper, sugar cane, mango, and numerous others less generally known, are found, with many smaller plants appropriate to a tropical landscape.

The *tropical house*, No. VII, presents great interest to the pharmaceutist from the number of important medicinal plants it contains, such as aloes, annatto, arrow root, bael, balsam Peru tree, quassia, camphor, theobroma, cinnamon, cloves, ginger, indigo, ipecacuanha, logwood, matico, nutmeg, patchouli, cinchona (four species), sandal wood, sarsaparilla, tonqua bean, and Wintersbark.

Near the centre of the pleasure grounds is "the new temperate house," an immense structure not yet completed, but perfect as far as it goes, and containing a great variety of Australian plants, especially eucalypti and acacias, Chinese and Japanese, New Zealand, Chilian, and East Indian plants. This house, with its octagonal appendages and those yet to be added, will embrace nearly two acres under glass, and brings together a large nmber of important genera.

Besides these, there are special houses for the ferns, the begonias cacti, and the orchideous plants and tropical tree-ferns. There is also a tropical aquarium for water plants, 36 feet in diameter, which has fine specimens of the Victoria regia, nymphæas, etc.

An exceedingly interesting part of the grounds is that laid out in beds, and devoted to annuals and herbaceous perennials, and especially those used in medicine; yet they bear a very small relation in extent to the other portions of the garden. Nowhere else did we see such ample, unlimited room for all purposes, whether the subject was a gigantic cedar or a tiny rhodendron, or a bed of annuals; there is no cramping, as in most of the botanical gardens of the continent, hedged in by the houses and streets. And then the arboretum! Think of 270 acres laid out in walks and avenues, with noble trees drawn from all countries which can be acclimated, planted in generic groups, so that one may see the maples of California and Oregon side by side with those of the Atlantic States and Europe. Very fine oaks, elms, beeches, birches, hickories, and cedars, and a pinetum, with representatives from almost all temperate countries, southern and northern. Besides these living specimens, Kew contains an extensive herbarium, which has grown rapidly of late years. Dr. Hooker, in his report for 1865, speaks of eighty donations, representing in all nearly 100,000 plants from all parts of the world, and especially Brazil and Africa, as having been received. In fact, the herbarium is the largest in existence, and constantly increasing, and, together with the library, forms a great centre of botanical research, where a corps of botanists, to the number of fifty, are permitted to make their investigations.

Another feature due to the late Sir William J. Hooker, are the museums of economic botany, commenced in 1847, the first of their kind established, and by far the most extensive in the world. The universal exhibitions, 1851 and 1862 at London, and 1855 at Paris, gave large accessions to the collection, and we have no doubt it will be increased largely from the vast collections of natural vegetable products in the Paris Exhibition, 1867. "The object of the museums is to show the practical application of botanical science." We can there learn the relations of the vegetable world to man, what our food, timber, and medicines come from, and how much besides a knowledge of flowers and leaves may be derived from a study of botany. There are three museums. In the first and second the products are arranged according to the botanical natural orders, and the first museum includes the products from dicotyledonous plants, the second those from monocotyledons and acotyledons, whilst the third museum is devoted to the specimens of timber and bulky articles, and is largely made up of the products of the British colonies.

The concentration of so much that is beautiful and interesting in nature, arranged with special reference at once to the gratification of the public and the advancement of science, renders Kew Gardens one of the

most useful scientific establishments of the many which cluster around the great metropolis of England, and derive their sustenance from the general government.

We cannot close without referring to the garden at Edinburgh, of which Dr. Balfour is director, and Mr. McNab the practical superintendent, as one of the most interesting and well-kept anywhere seen. The palm house is in excellent condition, and claims to be better located than that at Kew, but the grounds everywhere indicated that a master-hand was in charge. We saw the remains of the Narthex assafœtida; it being late in the season (August), only one unwilted leaf remained, and about forty young plants had been raised from seed.

APRIL, 1868.

NON-OFFICINAL FORMULÆ IN LOCAL USE.

A friend in Washington has kindly sent the Editor a little pamphlet volume, of which the following is the *title page:*

Non-officinal formulæ in local use, compiled and published by the joint committee of the Medical and Pharmaceutical Associations of the District of Columbia. Washington, 1867; pp. 32.

This little work is without a preface, or any explanatory note. It is gotten up for the purpose of giving uniformity to a class of preparations that are very liable to vary as made in different shops in the same city, so as to render their prescription by physicians uncertain. The great trouble in such preparations arises from a disposition on the part of pharmaceutists to make them proprietary specialities, and to claim for them a character superior to other preparations of the same class. Now the existence of such a work as the above indicates an *esprit du corps* on the part of the Washington pharmaceutists which is quite commendable. Many of the formulæ are taken from the journals, but, issued in this way, the dispenser is not at a loss in knowing which to use when a prescription is received. The following is a selection of some that we have not before published:

Elixir Cinchonæ, Ferri et Bismuthi.

Take of Citrate of Bismuth and Ammoniæ, four drachms.
Citrate of Iron and Ammoniæ, two drachms.

*Ferrated Tincture of Cinchona, eight fluidounces.
Syrup of Orange-peel, four fluidounces.
Distilled Water, three and a-half fluidounces.
Tincture of Cardamom, four fluidrachms.
Water of Ammonia, a sufficient quantity.

Dissolve the citrate of bismuth and ammonia in the distilled water; add water of ammonia in slight excess; then dissolve the citrate of iron and ammonia; add the ferrated tincture and tincture of cardamom; filter, and add the syrup of orange-peel. Each fluidrachm contains nearly two grains each of the salts of bismuth and iron.

Elixir Chloroformi (Chloroform Paregoric of Dr. Hartshorne.)

Take of Chloroform,
Tincture of Opium,
Tincture of Camphor,
Aromatic Spirit of Ammonia, of each a fluidounce and a-half.
Oil of Cinnamon, twenty minims.
Brandy, two fluidounces.

Mix. Dose, half a fluidrachm or less.

Elixir Ferri Pyrophosphatis.

Take of Pyrophosphate of Iron, three hundred and twenty grains.
Distilled Water, eight fluidounces.
Syrup of Orange peel,
Best Brandy, of each four fluidounces.

Mix.

*The Ferrated Tincture of Cinchona used in this preparation is made in the following manner:

Take of Calisaya Bark, in moderately fine powder, a troyounce.
Bitter Orange-peel, in moderately fine powder, six drachms.
Serpentaria, in moderately fine powder, one drachm and a-half.
Diluted Alcohol, a sufficient quantity.
Sub-carbonate of Iron, four ounces, or a sufficient quantity.
Boiling Alcohol, a sufficient quantity.
Citrate of Iron (soluble), one hundred and sixty grains.

Mix the powders, and having moistened the mixture with one fluidounce of diluted alcohol, pack it firmly in a glass percolater and gradually pour diluted alcohol upon it, until ten fluidounces of tincture are obtained. Moisten the sub-carbonate of iron with four fluidounces of diluted alcohol, add the tincture; agitate briskly for fifteen minutes; set it aside for 24 hours; test a portion with solution of subsulphate of iron; if a precipitate should form treat it with more of the sub-carbonate, till the tincture tested remains clear; filter, add sufficient boiling alcohol through the filter to make the tincture measure ten fluidounces. Lastly dissolve the citrate of iron in the tincture.

Elixir Picis Liquidæ Compositum.

Take of Wine of Tar,* a pint.
Syrup of Wild Cherry Bark,
Syrup of Tolu, of each four fluidounces.
Rectified Wood Naphtha (methylic alcohol), a fluidounce.
Sulphate of Morphia, four grains.

Mix. Dose, two teaspoonfuls.

Lotio Alba Boracis (nipple wash).

Take of Borax, a drachm.
Boiling Rose-water, a fluidounce.

Dissolve, filter, and add—

Oil of Sweet Almonds, a fluidounce.

Mix well.

Pilulæ Podophyllini Compositæ.

Take of Podophyllum, six grains.
Leptandrin, twelve grains.
Extract of Nux vomica, three grains.
Extract of Aloes, twenty-four grains.

Mix, and make twenty-four pills.

Dose, one to three pills.

Emplastrum Peruvianum (breast plaster).

Take of Lead Plaster,
Plaster of Ammoniac with Mercury,
Soap Plaster, of each two troyounces.
Powdered Camphor, six drachms.
Balsam of Peru, four drachms.
Mercurial Ointment, two drachms.

Mix.

Mistura Hæmostatica (Warren's).

Take of Concentrated Sulphuric Acid, five drachms.
Alcohol, and Oil of Turpentine, of each two drachms.

Add gradually the acid to the turpentine, and then the alcohol, using care.

Vinum Pepsicum (wine of pepsin).

Take of Pepsin, in powder, a drachm and a-half.
Distilled Water, six fluidrachms.
White Sugar, a troyounce.
Sherry Wine, fifteen fluidrachms.
Alcohol, three fluidrachms.

Mix.

* The Wine of Tar here indicated is made as follows:

Take of Tar, six troyounces.
Carbonate of Magnesia, two troyounces.

Mix thoroughly, and add—

Sherry Wine, four pints.

Digest for ten minutes, and filter, adding sufficient sherry wine on the filter to make the product measure four pints.

PROFESSOR GAMGEE'S METHOD OF PRESERVING MEAT.

The necessity of some plan for preserving meat has long been felt. Hence it is that every plan, as soon as announced, is seized by the anxious public. If we may believe late reports from London, this desire is at last soon to be gratified, and in a manner which will leave nothing desirable unaccomplished. It seems that Professor Gamgee, President of the Albert Veterinary College of London, author of several works upon the cattle plague, and a recognised authority in such matters, discovered a new process for preserving meats, which he has patented in Europe and America. The process is simple and quite inexpensive. The animal, when practicable, is caused to inhale carbonic oxide gas. Before it is quite insensible it is bled in the usual way. When dressed the carcass is suspended in an air-tight receiver, the air exhausted, and the receiver filled with carbonic oxide gas; a small quantity of sulphurous acid gas is also added. After remaining here for from 24 to 48 hours, meat may be removed, and hung in a dry atmosphere; it will keep for one, two, or three months, or longer, with no preceptible change in taste or appearance. The tests of the method thus far applied have been attended with success. Beef killed in London in March last was sent to New York in June, and as late as the middle of July was shown to a prominent butcher in Fulton market, who did not discover that it was other than ordinary beef, and expressed the opinion that it had probably been killed about two days. Mutton killed in London last July, and sent to this city soon after, is now perfectly fresh, and one piece of beef kept for ten days in a can surrounded by water at a temperature of 90 to 100 degrees, came out perfectly fresh. The process, in the opinion of eminent chemists, does not injure the meat in the least, which is an advantage very difficult of attainment, even in the case of transportation of live stock, which is liable to the bad effects of confinement and the length of the journey. Among the benficial results of the adoption of this scheme would be a better supply in our markets of wholesome meat and at a desirably cheaper rate. It is expected that Prof. Gamgee will soon visit this country for the purpose of inaugurating his project.—*Lond. Chem. News, April* 3, 1868, *from American Journal of Mining.*

ON THE MELTING AND SUBLIMING TEMPERATURES OF THE PRINCIPAL POISONS, ORGANIC AND INORGANIC.

By William A. Guy, M.B, F.R.S.
Professor of Forensic Medicine, King's College, London, etc.

This communication does not exhaust the subject of which it treats. Its aim is to indicate and describe a simple method of procedure by which a new element is added to the natural history and diagnosis of poisons. It is a very obvious development of the method of sublimation described in previous communications to the 'Pharmaceutical Journal;'* and it will be seen to have the special recommendation of applying heat in so gradual a manner as to guard against the chief objection to Helwig's plan still more completely than the modification I have already recommended. It may be well to add, by way of preventing any possible misconception of the object of this paper, that the experiments to which reference will be made are limited to commercial specimens of poisons, and to such of them as are sold as white powders or colorless crystals. For the alkaloids and active proximate principles I am indebted to the Messrs. Morson, —as I am, indeed, for almost all the preparations which I employ. The results of the sublimation of the alkaloids, as obtained from solutions of their salts, and from organic matters, must be the subject of future communications.

If any excuse were needed for the present attempt to confer a more definite character on the test of heat as applied to poisons, it would be found in the fact that already, in all works on toxicology, the results of the rough method of procedure with the spirit-lamp and platinum-foil, or with the spirit-lamp and reduction-tube, are set forth with many of the poisonous substances to which they are deemed applicable. The following may be taken as a fair specimen of the description of these results as obtained with the spirit-lamp and platinum-foil:—

1. *Arsenious Acid.*—Wholly dissipated, as a white vapor, at a temperature of 370°.

2. *Corrosive Sublimate.*—Melts, and is wholly dissipated,

* See papers on the "Sublimation of Alkaloids," 'Pharmaceutical Journal' for June, July, August, September and October, 1867.

without combustion or being carbonized, in white vapor, without residue. (No indication given that the poison may be sublimed prior to melting, and even without melting.)

3. *Oxalic Acid.*—Melts and is wholly dissipated. (Again no statement that the poison may sublime before melting.)

4. *Binoxalate of Potash.*—Leaves a white ash. (No allusion to the fact that this poison also sublimes.)

5. *Arsenic Acid.*—Not entirely volatilized. (An obviously imperfect description of the effects of heat.)

6. *Acetate of Lead.*—Leaves residue of yellow oxide with reduced metal.

7. *Carbonate of Lead.*—Residue of yellow oxide.

8. *Morphine.*—Melts, darkens, burns like a resin, and deposits carbon. (No indication that the poison partially sublimes before melting.)

9. *Strychnine.*—Melts, and burns like resin, with a black, smoky flame. (No indication of prior sublimation.)

10. *Aconitine.*—Fuses, and burns with a bright yellow flame.

11. *Atropine.*—Melts, darkens, and burns with a yellowish smoky flame.

I will now add an equally short statement of results, described as commonly obtained with the reduction-tube, heated by the flame of the spirit-lamp.

1. *Arsenious Acid.*—Sublimed without melting, forming a ring of brilliant octahedral crystals.

2. *Corrosive Sublimate.*—Melts, and sublimes as prismatic crystals, sometimes stellated.

3. *Oxalic Acid.*—Melts; vapor condensed as white crystalline sublimate.

4. *Acetate of Lead.*—Melts, becomes solid, melts again, darkens, yielding vapors of acetic acid, and leaves residue of carbon and reduced lead.

5. *Tartar Emetic.*—Chars, but does not previously melt. Metal partially reduced. Residue has a grayish-blue metallic lustre.

6. *Morphine.*—As with platinum-foil. Ammonia given off. (No mention of any sublimate.)

7. *Strychnine.*—Also yields ammonia. (No mention of any sublimate.)

8. *Aconitine.*—Evolves vapors, first alkaline, then acid.

These brief extracts, taken from a work which is likely to contain as much information on this subject as is to be found in any one authority,* will serve to show:—1. That two modes of applying heat to poisonous matters are in common use, and are deemed to afford indications of such value as to serve, if not as tests, at least as necessary elements of their natural history; 2. That these methods are either so rough in themselves, or have been used for each poison so rarely that some of the phenomena to which they give rise have wholly escaped observation; and 3. That some more delicate and precise mode of applying heat is still a great desideratum.

Now it is obvious that there would be no difficulty in associating with these rough methods the determination of the temperature at which the several poisons melt or sublime, and equally obvious that out of such association there must inevitably arise such striking differences and contrasts as would serve the purposes both of accurate physical history and of diagnosis. It would suffice to plunge the bulb of a thermometer indicating high temperatures, and a short reduction-tube made of glass of the same thickness as the tube of the thermometer itself, side by side into melting oil, a sand-bath, or even a hollow nipple of copper or brass. The melting and subliming temperatures would thus be ascertained under the necessary conditions of equality of heat, and the sublimates would form in the higher part of the tube. If the tube were made of the glass which presents in section a flattened ellipse, and it were drawn out into a capillary tube, it would be easy to seal the capillary portion at both ends, and examine the contents under the microscope.

But as, by adopting this plan, we should sacrifice the great advantages which obviously arise from substituting a flat surface of glass for the reduction-tube, I did not hesitate to prefer an arrangement which would enable me to ascertain the melting or subliming temperature, or both, with sufficient accuracy for every

* "The Principles and Practice of Medical Jurisprudence," by Alfred Swaine Taylor, M.D., F.R.S., etc.

practical purpose, at the same time that I retained the advantage of the glass disk. The simple apparatus which I devised for this purpose, and which I found to admit of ready application, and to yield very satisfactory results, consists of a plate of copper, with a hollow nipple of the same metal worked into the centre of it, without the use of solder. This nipple receives the narrow bulb of a thermometer indicating all temperatures up to 700° F. The thermometer is supported by a perforated cork fitting a ring of a retort-stand. The apparatus is used as follows:—A minute quantity of the poison or other substance to be examined (say the $\frac{1}{100}$ grain) is placed on a small fragment of microscopic glass, and this on a part of the copper plate, between the centre and circumference. It is then surrounded with a glass ring, on which a clean disk, previously dried in the flame of the spirit-lamp, is placed. The flame of the spirit-lamp is then steadily applied to some point of the copper plate equidistant from the object and the thermometer. The instrument must be placed in a good side-light, and the eye of the observer should be at such a level as to see with equal ease the object itself, the surface of the glass disk, and the scale of the thermometer. To get good results with this simple instrument, the flame of the lamp should be so applied that the temperature may rise steadily and rather slowly, so that each observation made on the substance under examination or on the superimposed disk, may coincide very nearly with temperature indicated. But as the heat imparted to the mercury in the bulb of the thermometer does not immediately travel to the metal in the upper part of the tube, it is necessary to withdraw the lamp directly the change which we are looking for occurs, either in the substance under examination or on the disk of glass. The thermometer will then be observed to rise a few degrees, and the highest point to which it attains should be set down as the temperature (approximately) at which the change in question was perceived.

From this description it will be seen at once that this method is not susceptible of extreme accuracy. When we speak of any particular temperature, as that at which a certain change (as melting or subliming) takes place, we mean the temperature at which, using care and caution, we first perceived a change of

form in the substance, or a mist upon the disk. We may miss the precise moment of the change, and make too high an estimate of the temperature. Such errors of observation have been guarded against, in the case of the results presently to be detailed, by repeating the experiment several times with the same substance. Proceeding thus, I have rarely found occasion to correct my first entries of results; and I believe that the method will be found to yield approximations sufficiently close for every practical purpose, if we only adopt the simple and obvious precaution of not attaching importance to differences of a few degrees between the melting or subliming points of two poisonous substances. If, for instance, we experiment with a substance which melts at 220°, and assume it to be codeia, it would be a valid objection that paramorphia and papaverine melt at 210°. So also with aconitia and atropia. A temperature of 140° would not justify us in assuming that we are dealing with aconitia, seeing that atropia melts at 150°. But if we suppose that a minute quantity of a white powder is placed in our hands, and that it *sublimes* at 210°, we know that it cannot be veratria, which *melts* at 200°, or paramorphia or papaverina, which undergo the same change at 210°, or codeia, which melts at 220°. The substance belongs to a wholly different group. It might be muriate of ammonia, which *sublimes* at 210°, or powdered cantharidine, which sublimes at 212°, or even corrosive sublimate, which sublimes at 200°, either not melting at all, or melting at a higher temperature after subliming.

These observations will have prepared the way for a classification of poisonous and other substances, which promises to be of practical diagnostic value. In performing these experiments in the manner indicated, we encounter three leading sets of phenomena:—

1. Sublimation without change of form or color.

2. Sublimation without change of form or color, followed by melting, with or without change of color and further sublimation.

3. Melting and change of color, followed by sublimation.

I now proceed to arrange the principal poisons under these three heads, giving the results obtained with the apparatus as above described.

1. *Sublimation without change of Form or Color.*—This class comprises corrosive sublimate and calomel, arsenious acid and cantharidin, which, if the heat is gradually increased, and then maintained at or near the temperature indicated, are gradually dissipated in white vapor, and leave, if pure, no residue.

This graduated sublimation, therefore, differs somewhat from the quicker process with the spirit-lamp and platinum-foil, which places the four substances in two classes; the one containing arsenious acid and calomel, which do not melt, but are converted into white fumes, without residue; the other corrosive-sublimate and cantharidin, which, as the heat is usually applied, first melt, and then disperse in white vapor, leaving also no residue.

The subliming temperatures of the four poisons are as follows:—

Corrosive sublimate, at	or about	200°	Fahr.
Cantharidine	"	212°	"
Calomel	"	240°	"
Arsenious acid	"	280°	"

As this temperature of 280°, for arsenious acid, is very low compared to that commonly assigned (370° to 400°), I have carefully repeated the experiments with this poison, and find a distinct sublimate, showing crystals under the microscope at this temperature. To obtain large sparkling crystals a higher temperature is required. I have also obtained sublimates in several reduction-tubes immersed in a sand bath side by side with the thermometer at a temperature never exceeding 300°; and some of these consisted of large sparkling crystals. On referring to works of authority, I find the subliming temperature of arsenious acid variously stated—by Miller and Bloxam at 380°, and in the British Pharmacopœia at 400° (not exceeding 400°). Dr. Taylor places it at the low figure of 370°. All these figures much exceed the temperature indicated in my own experiments; and, as the small quantities which I employed cannot account for the discrepancy, I am at a loss to explain it. I ought, perhaps, to state that, in the experiments with the small reduction-tubes, I used fragments of solid arsenious acid, none of which could have exceeded a grain in weight.

If this first group were enlarged so as to embrace substances

which yield sublimates resembling somewhat those of one or other of its members, it would include muriate of ammonia, which sublimes at or about 210° Fahr., and yields a sublimate which might be confounded with the less defined forms of arsenious acid. The most successful sublimates of muriate of ammonia consist wholly of cubes. Sublimed from platinum-foil, it first crepitates, and is then dissipated in white fumes.

2. *Sublimation without Change of Form or Color, followed by Melting with or without Change of Color and with further Sublimation.*—This class includes the three poisons—*oxalic acid, morphia and strychnia.* The first (oxalic acid) sublimes, then melts, and is dissipated without residue. The second and third (morphia and strychnia) first yield sublimates, then melt and darken, continue to sublime, but leave a distinct layer of carbon. These changes take place at the temperatures indicated below:—

Oxalic acid	sublimes	at or about	180°,	melts at or about	280°
Morphia	"	"	330°,	"	340°
Strychnia	"	"	345°,	"	430°

3. *Melting, Change of Color and Sublimation.*—This class comprises all the poisonous alkaloids and glucosides, except the members of class 2,—morphia and strychnia. Their melting and subliming temperatures are given below, arranged in the order of their melting temperature, beginning with the lowest:

Aconitia	melts	at or about	140°,	sublimes	at or about	400°
Atropia	"	"	150°	"	"	280°
Delphinia	"	"	150°	"	"	300°
Veratria	"	"	200°	"	"	360°
Brucia	"	"	240°	"	"	400°
Digitalina	"	"	310°	"	"	310°
Picrotoxia	"	"	320°	"	"	320°
Solania	"	"	420°	"	"	420°

I add a statement of the melting and subliming temperatures of the members of the opium-series:—

Meconina	melts	at or about	120°,	sublimes	at or about	180°
Narceia	"	"	170°	"	"	430°
Paramorphia	"	"	210°	"	"	320°
Papaverina	"	"	210°	"	"	310°

Codeia	melts at or about	220°	sublimes at or about	220°
Narcotina	" "	240°	" "	310°
Cryptopia	" "	350°	" "	350°

All these substances, it need not be stated, yield, like morphia and strychnia, a more or less abundant carbonaceous residue, by which the alkaloids and glucosides are distinguished from most other bodies. To these distinctive characters that of giving out a marked odor, in some cases agreeable, in others offensive, ought to be added. As the result of repeated careful experiments, both with platinum-foil and the porcelain slab, I give the following:—Strychnia, pleasant but not easy to describe; morphia and atropia, as of singeing; brucia, as of burnt horn; aconitia, not disagreeable, but ill-defined; veratria, mousy and irritating to the nostrils; digitalina, as of the drug; solania, as of roast apple.

On comparing class 2 with class 3, it will be obvious that, with common care in applying heat, it would not be possible to confound the two important alkaloids, morphia and strychnia, with any other known poisons. A white powder or crushed crystal, which first sublimed at 330°, or from that to 345°, melted at some higher temperature, and continued to yield sublimates till it left a final carbonaceous deposit, must be either morphia or strychnia. If both changes happened at the lower temperatures indicated in the table, it would be morphia; if at the higher, strychnia. The peculiar white disks developed in the sublimate are common to the two alkaloids, and the forms of the sublimates might also not prove characteristic. Hence it might be necessary to resort to the color test or the carbazotic-acid test, to render the diagnosis certain. A glance at the tables will show that many of the alkaloids or glucosides melt and sublime also at temperatures so low as not to admit of being confounded with either of these important poisons.

It will be observed that some of the poisons in class 3 (digitalina, picrotoxia, and solania, in the first group, and codeia and cryptopia, in the second) have appeared to melt and sublime at the same temperature. They have seemed to melt and then sublime, with a scarcely appreciable interval. As there is not apparently even the small difference of 10° shown in the case of

morphia, they have been grouped as above. Of solania it may be stated that it darkens, and grows almost black, before it melts.

I will now give brief notices of other experiments made with the apparatus above described, and then bring the paper to a close by presenting a tabular form, embracing the principal poisons which we encounter as white powders or colorless crystals.

1. *Oxalate of ammonia* yields sublimates at 280°, and is wholly dissipated by heat.

2. *Binoxalate of potash* yields sublimates at 280°, and leaves a white ash.

Camphor sublimes at 150°.

Cyanide of Mercury begins to sublime at 320°.

Oxide of antimony sublimes slowly and scantily at 480°.

Tartar emetic decrepitates at 380°, sublimes slowly and scantily at 480°, and chars at about 550°.

Sulphur melts and sublimes at 180°.

The volatile metals crushed into coarse powder sublime as follows:—

Arsenic	. . .	at 230°
Selenium	. . .	" 350°
Cadmium	. . .	" 480°
Tellurium	. . .	" 500°

Table showing the approximate results, for the principal poisons, of sublimation at ascertained temperatures:—

		Temperature. Sublime.	Melt.
1. Sublime without change of form or color, yielding white vapor.	Corrosive sublimate	200°	
	Cantharidina	212°	
	Calomel	240°	
	Arsenious acid	280°	
		Sublime.	Melt.
2. Sublimes, then melts, without change of color, and is wholly dissipated.	Oxalic acid	180°	280°
3. Sublime, melt and yield carbonaceous residue.	Morphia	330°	340°
	Strychnia	345°	430°

			Sublime.	Melt.
4. Melt, change color, sublime, and deposit carbon.	Aconitia	. . .	140°	400°
	Atropia	. . .	150°	280°
	Delphinia	. . .	150°	300°
	Veratria	. . .	200°	360°
	Brucia	. . .	240°	400°
	Digitalia	. . .	310°	310°
	Picrotoxia	. . .	320°	320°
	Solania	. . .	420°	420°
5. Decrepitates, sublimes slowly and scantily, and chars.	Tartar emetic	. 380°	480°	550°

—*Lon. Pharm. Journ., Feb.*, 1868.

ON THE CULTIVATION OF AND TRADE IN ROMAN CHAMOMILE.

The Roman or noble chamomile (*Anthemis nobilis* L.), which grows wild in the mountain meadows of Southern Germany, is largely cultivated in the district lying between Leipzig and Altenburg. The village of Kieritzsch is particularly noted, and in the neighborhoods of Zwenkau, Roetha, Borna, Lucka, Gaschwitz, Gaulis, Spahnsdorf, Lippendorf, Trachenau, &c., it has also been grown by many farmers with advantage.

The young plants, previously taken off as layers, are planted in April or May, in such manner that around each one there is about a square foot of space. In favorable weather the plant grows quickly and spreads regularly over the soil, so that the whole field becomes evenly covered; the flowers appear upon the shoots in such numbers, that a field of chamomile in the season of blooming looks as though it were covered with a white cloth, provided the weather is favorable. The blossoming begins in July, and lasts until autumn, so that the gathering of the flowers can be continued until that time. The culture consists in carefully pruning the plants, as long as the space is not entirely overrun by them—and after that, simply in weeding. An uniform summer temperature agrees best with the plants; too wet a season produces too luxuriant a growth, to the disadvantage of the blossoms; even in a continued drought, if other circumstances are favorable, the blossoms are produced abundantly.

In the larva of a beetle (*Elater segetum*) the chamomile have an enemy, which by eating into the root causes its death.

The pulling of the flowers is accomplished very rapidly, as the flower-heads are very easily separated from the stalks, and by simply plucking they can be gathered almost entirely free from the pedicels.

The price varies greatly in different years, ranging from 1 to 20 newgroschen per pound of dry flowers. The usual price is from 4 to 6 newgroschen. The trade in them is carried on chiefly through Madgeburg and Hamburg with Portugal, Spain, Italy, Greece, Turkey, Syria, Egypt, the East Indies, and North America. It yields a profit of more than 300 per cent. In 1865, in consequence of the outbreak of the cholera in the South of Europe, and the extraordinary demand occasioned thereby, the producers received 40 thalers per hundred-weight for a good article, and certain growers, by reason of the favorable weather, obtained about 200 thalers per acre clear profit.—*Wittstein's Vierteljahr.* Oct., 1867.—G. J. S.

AQUA NICOTIANÆ.

By J. S. Unziker, M.D., Cincinnati.

Take of fresh green tobacco leaves eight pounds, cut them and add alcohol one and a half pounds; water sufficient; mix and distil eight pounds.

Care must be taken that the leaves do not become heated by being tied up in bundles, as this would impair the preparation and impart to it the odor of tobacco. The leaves should be taken just before the plant begins to bloom, and should then be worked up as soon as possible; for when the leaves once become spotted, the preparation assumes more or less the poisonous effects of dried tobacco, which is not the case if freshly prepared.

This remedy was first introduced in Germany by Dr. J. G. Rademacher, and if prepared as above stated can be given with perfect safety to the smallest child, without any of the injurious effects produced by dried tobacco. From this I judge that nicotin is not developed and communicated to the distillate as long as the leaves are fresh. For the last eighteen years I have used the aqua nicotinæ with the best results in the first stages of pneumonia and fevers generally. It reduces the pulse promptly, the same time acting as a strong diaphoretic, making it especially

adaptable to all fevers originating from colds. But where the tongue is dry, or becomes so after taking it—which is rarely the case—it must be omitted. Its action on the spine and cerebellum is also remarkable. In fevers of children, where diarrhœa is present, and the brain more or less implicated, and opiates inadmissable, it gives prompt relief by reducing the fever, promoting the action of the skin, and gradually checking the diarrhœa and removing all cerebral symptoms. The dose for adults if from ʒss—ʒj every hour or two, and may, with advantage, be given in the form of a mixture in combination with nitrate of soda, acetate of potassa or bi-carbonate of soda.—*Cin. Lancet and Observer, March*, 1868.

SOLUTIONS OF MORPHIA AND CAFFEIN IN CHLOROFORM.

By Prof. W. Bernatzic, in Vienna.

Prof. Bernatzic communicates the following formula for obtaining a uniform and permanent combination of morphia with chloroform, viz.: three grains of pure morphia are dissolved, with the aid of three drops of strongest acetic acid and the application of gentle heat, in one drachm of strong alcohol (93·94 p. c.), to which, when cold, is added one-half ounce of chloroform. Three drops of this solution have been found to correspond to one grain; hence, thirty drops (ten grains) contain one-tenth of a grain of morphia, which may be considered as an average dose. The efficacy of this solution is undoubtedly due to the morphia mainly, and the dose should be regulated by the amount of the latter. Yet the action of the chloroform should not be undervalued, as it not only directly increases the anæsthetic effect of the morphia, but enhances it also by favoring the absorption of the latter at the seat of application, by reason of its own high degree of diffusibility. Locally applied, the influence of the chloroform is first felt with its undesirable irritating action, but gradually an anæsthetic effect becomes manifest, which neither of these remedies alone are capable of producing.

Most frequently the remedy proved useful in toothache, ap-

plied to the gums near the affected tooth rather than to the denuded pulp itself. A wad of cotton saturated with the compound and introduced into the ear, though at first causing painful sensations, assists in removing the pain. The latter means is also serviceable in painful affections of the internal ear. Sometimes the author also used it as a mouthwash, diluted with much water.

In using this remedy internally, it was observed that the frequent disagreeable concomitant effects of morphia, especially nausea and vomiting, were prevented by the chloroform. Hence the combination exerts a peculiarly favorable influence upon painful affections of the stomach and bowels, in the dose of twenty or thirty drops, taken on sugar or in some tea.

Besides the quieting and anæsthetic effect (which has been found to take place in still other affections besides the above named, more rapidly and more completely than by morphia alone), the tendency to sleep which this remedy induces is undeniable, and the latter approaches more nearly to the character of natural sleep than of narcosis.

Although caffein cannot, strictly speaking, be regarded as an anæsthetic, but, judging from its physiological action, should rather be considered as a means of giving impulse to the motor apparatus, yet it cannot be denied that it has proven useful in many cases of neuralgic affection. In certain forms of nervous cephalalgia, especially, it has not alone been palliative, but even effected radical cures. Koschlakoff's investigations (*Virchow's Archiv.*, 1864) have shown that caffein increases the heart's action and the pressure in the arteries, and that its diuretic effect is based upon the increased arterial pressure. The author is disposed to regard hemicrania as a vasomotor neurosis, and, according to this view, does not find it difficult to explain the efficacy of caffein in this disease in harmony with its known physiological action. Upon the sensory nerves caffein seems to exert no direct influence; indirectly, by reflex action, it may indeed cause hyperæsthesia. The combination of chloroform with it in an equivalent dose might therefore aid its effects in the intended direction without interfering with the physiological powers of the caffein.

The formula for this combination is given as follows: Ten grains of caffein are dissolved, with the aid of a gentle heat, in two drachms of strong alcohol, previously mixed with one-half drachm of water; when cooled, two drachms (by weight) of chloform are added. The preparation is to be protected from the light. Thirty grains of this solution, or seventy-five drops, contain one grain of caffein. It is used by the author in hemicrania, upon the occurrence of premonitory symptoms, in doses of fifteen or twenty drops, at short intervals. An essential adjuvant of the cure or improvement, is a strict adherence to a chiefly animal diet for a longer period, especially by such persons as are affected with chronic lesions of digestion, dyspepsia, colic, constipation, etc.—*Detroit Rev. of Med. and Pharm., Feb.*, 1868, *from Wienner Med. Presse.*

ON A NEW MANUFACTURING PROCESS FOR THE PERPETUAL REGENERATION OF OXIDE OF MANGANESE USED FOR THE LIBERATION OF CHLORINE FROM HYDROCHLORIC ACID.*

By Walter Weldon.

Every process, previous to that to be described in the present paper, by which it has been attempted to regenerate oxide of manganese from the residues of the manufacture of chlorine, has been performed in the dry way, and has thus required considerable time, and has involved not only at least one—more or less troublesome and costly—furnace operation, but also several removals of the material from vessel to vessel and from place to place; every such removal, of course, entailing more or less loss of material. The process, however, which is about to be described is performed in the wet way, and may be completed, even when operating on the largest scale, within as little as one hour. Moreover, all the operations of the process are performed in the same vessel as that in which the oxide produced by it is afterwards employed to react with hydrochloric acid, and from this vessel or still the manganese is never removed, so that it is entirely free from risk of loss by removal; and as it is not subject to any other cause

* Read before the British Association at Dundee.

of loss, a charge of manganese, once put into a still, when treated by this process, not only never needs to be replaced, but never needs even to be added to, while it will liberate an equivalent of chlorine every few hours for literally any length of time. The starting-point of any process for the regeneration of the oxide of manganese employed in the manufacture of chlorine, must, of course, be that residue which is known as "still-liquor," being that which remains in the stills when oxide of manganese and hydrochloric acid have been digested together until all the chlorine which the oxide is capable of liberating from the acid has been liberated and given off. When working with a native oxide of manganese, the still liquor contains, in addition to a quantity of protochloride of manganese, equivalent to the quantity of oxide of manganese which has been dissolved, a considerable quantity of free acid, and more or less chlorides of iron and other bases due to the native oxide of manganese being always more or less associated with other oxides. When working, however, with the artificial oxide of manganese produced as is about to be described, the still-liquor contains scarcely anything whatever but protochloride of manganese; and the new process consists simply in first adding an equivalent of lime to this liquor, without removing the liquor from the still, and then blowing atmospheric air through the resulting mixture of protoxide of manganese and solution of chloride of calcium. The white protoxide is thereby rapidly converted into a very dark-colored higher oxide, and when this product has been allowed to subside from the solution of chloride of calcium in which it was formed, and the greater part of that solution has then been drawn off from it, it is ready to be treated with hydrochloric acid, from which it then liberates chlorine, with reproduction of exactly as much protochloride of manganese as was commenced with. From this point the very simple series of operations described is repeated just as before, and so on, over and over again, for any required number of times. The manganese is thus constantly undergoing, always in one and the same vessel, a round of regularly recurring changes of state of combination, by which it passes, first from the state of protochloride to that of protoxide, next from the state of protoxide to that of a higher oxide, capable of libera-

ting chlorine from hydrochloric acid, then back again to the state of protochloride, and so on continually. As regards the richness of the oxide produced by the process above described, sesquioxide is all that one would have expected to obtain by means of it, but it actually yields a richer product than sesquioxide. Sesquioxide of manganese is, practically—at least from a chlorine manufacturer's point of view—a mixture or compound of about 55·5 per cent. (being one equivalent) of binoxide with about 44·5 per cent. (being also one equivalent) of protoxide; while the oxide most frequently obtained by the process above described contains about 65 per cent. of binoxide, which is about the proportion of binoxide that would be contained in a mixture or compound of three equivalents of binoxide with two equivalents of protoxide. The richest native oxide of manganese which chlorine manufacturers have been in the habit of using, contain about 70 per cent. of binoxide; but a native oxide is practically much less valuable, so far as the manufacture of chlorine is concerned, than an artificial oxide containing considerably less oxygen. The reason is, that in order to dissolve a hard, compact, anhydrous native oxide of manganese, it has to be digested with a large excess of acid, resulting in the production of a still-liquor containing a very large quantity of free acid, all of which is practically lost; whereas a recently formed artificial, hydrated oxide, in an exceedingly minute state of division, will dissolve in a bare equivalent of acid, producing a still-liquor containing no free acid at all. Hence, whereas when using a 70 per cent. native oxide, it is rarely found possible to obtain in the free state more than one-sixth of the chlorine contained in the hydrochloric acid put into the stills, an artificial oxide of less even than 60 per cent. will liberate fully one-third of the chlorine contained in the acid put into the stills, and this in far less time, and at a much less cost for labor and fuel, than the native oxide requires for the liberation of half the quantity. The process which I have had the honor to bring before the section, thus, not only substitutes the cost of about seven shillings' worth of lime and three shillings' worth of blowing for every six or seven pounds which the manufacturer of bleaching-powder and other chlorine products has hitherto had to spend

upon peroxide of manganese, but also enables him to nearly double his productions of those products from a given quantity of hydrochloric acid.—*Lond. Pharm. Journ., Feb.* 1868.

ON THE CHARACTERISTICS OF THE DIFFERENT VARIETIES OF CREASOTE.

Although the creasote of coal-oil is often employed in pharmacy as a substitute for the creasote of beechwood, it by no means follows that the two products are identical. An observation made by M. Rust has led to the discovery of a reaction which permits of easily distinguishing between the two creasotes, namely, that creasote from coal forms with collodion a kind of jelly, whilst beechwood creasote produces nothing of the kind.

In Germany, a mixture of this sort is frequently employed for toothache, composed of equal parts of collodion and creasote: it should be gelatinous. Occasionally the product refuses to gelatinize, and this happens in dealing with beechwood creasote; the collodion thickens a little without losing fluidity.

The following are other reactions which serve to assist in characterizing the two species of creasote:—

Beechwood creasote is insoluble in ammonia, and gives with excess of weak potash a turbid solution.

Creasote from coal is insoluble in ammonia in the cold, but dissolves, forming a clear solution upon application of heat. It also gives a clear solution with weak liquor potassæ.

Lastly, with a neutral solution of perchloride of iron, beechwood creasote, dissolved in alcohol, gives a *green* coloration, whilst in alcohol solution of the coal-oil is colored *brown*. With aqueous solutions, on the contrary, creasote does not change color, whilst coal-tar creasote furnishes a blue.

According to an observation of M. Hlasiwetz, true creasote is found among the products of the distillation of guaiacum resin mixed with a homologue, $C_{14}H8O_4$,* which has been named guaiacol. It has been remarked by M. Gorup-Besanez that this latter body is also contained in ordinary wood-creasote in considerable proportion. It is the opinion of several chemists that

*C=6.

both these compounds possess the constitution of compound ethers; thus guaiacol is described as oxyphenate of methyl. The empirical formula of creasote is represented as C_{16},H_{10},O_4.

M. Frisch confirms, in general, the results obtained by M. Gorup. The creasote upon which he operated was a strongly refracting liquid, of specific gravity of 1·0784. It was perfectly soluble in alcohol, ether, bisulphide of carbon, as well as acetic acid. With ammonia, which it dissolved slightly, it gave a bluish-green coloration, which changed to brown. It dissolved oxalic acid and several alkaloids. With potash it gradually became brown, and, on the addition of ether, developed a blue tint, which disappeared on agitation. It boiled steadily at 195° C. (383° F.) With nitric acid it gave picric acid; with hydrochloric acid and chlorate of potash there are formed nacreous scales, consisting of chloranile and bichloroquinone. With sulphuric acid and application of heat it gave, after neutralization with baryta, a sulphosalt,—the sulphophenisate of baryta of Laurent,—soluble in alcohol and crystallizable. In the presence of bichromate of potash this sulphophenisic acid acquires an agreeable aromatic odor.

This creasote also answered to the test alluded to above, by giving with perchloride of iron in alcoholic solution a green color.—*Journ. de Pharm. et de Chimie.—Lond. Pharm. Journ. Feb.*, 1868.

CHEMISTRY OF OIL PAINTS.

Hitherto but very little attention has ever been given to the above subject by our leading chemists, but a work has recently appeared, published by the celebrated Dutch chemist, Mulder, in which a vast amount of useful information on this point is imparted, and much of the mystery connected with the chemical action of the different paints is satisfactorily explained. The starting-point of his investigations was an inquiry as to the best material to protect iron from rust. The result has been his rejection of all paints as unlikely to answer the purpose, and his conclusion that coal tar contains the best materials for a protecting coat. The author very completely investigated the na-

ture of paint, and the chemical changes involved in the drying of oils. As regards linseed oil, we are told that the essential constituent is "linolein," a compound of glycerin and linoleic acid. The latter body the author could not obtain quite pure, but he decides that its formula is $HO,C_{32}H_{27}O_3$.* When exposed to air, linoleic acid rapidly oxidises, first to "linoxic acid," a sticky body resembling turpentine. On longer exposure, "lynoxyn" is produced. This is a tough, leathery substance, sharing, we may say, many of the properties of caoutchouc. It is soluble in the same menstrua, and can be vulcanised like india-rubber. It is manufactured in considerable quantities in this country (United States), and is the binding material used to consolidate emery wheels. It forms also the surface of linoleum cloth. According to Mulder, there are two linoxyns, the white and red; the white modification becomes red on exposure to 80° Centigrade, and the red again turns white on exposure to sunlight. The browning of white paint in dark places the author ascribes to the gradual change of white linoxyn into red. Oxidation does not end with the production of linoxyn. It still proceeds to the complete decay of the material, as is seen in very old paint.

One useful result of Mulder's labor is a simple process for preparing a good colorless drying oil. For this purpose it is only necessary to boil linseed oil for two hours with three per cent. of red lead, filter it, and then expose it to sunlight in large shallow vessels, frequently renewing the air above. Another result is a denial of the existence of albuminous and gummy matter in linseed oil, to which are ascribed the slowness of drying of unboiled oils. For these matters Mulder searched in vain, and at last came to the conclusion that they had no existence. Oxides and acetates of lead, he tells us, act as driers, not by precipitating albuminous matters, but by forming a little linoleate of lead, which rapidly oxidises and communicates its activity to the oil.—*Chemist and Druggist, March*, 1868, *from Journ. Chem. Soc. vol. xviii, p.* 117.

* This agrees with the formula given in Watt's Dictionary, $C_{16}H_{28}O_2$, in which the modern atomic weights of carbon and oxygen are adopted.

ON THE PREPARATION OF UREA.

By John Williams, F.C.S.

Having had occasion to prepare rather large quantities of Urea, I found that the result constantly fell considerably short of what I considered a satisfactory one. This led me to consider if the ordinary mode of preparation could not be improved upon.

The result of my experiments is, that cyanate of lead is better adapted for the purpose than the mixture of salt generally present in solution, when the usual process is adopted. I proceed in the following manner:—

I prepare cyanate of lead by fusing cyanide of potassium of the best commercial quality (containing about 90 per cent. of real cyanide) at a very low red heat, in a shallow iron vessel; red lead is added in the usual manner, by small quantities at a time with constant stirring, so as to prevent the temperature rising too much during the operation. I prefer cyanide of potassium to ferrocyanide for many reasons, but mainly because the temperature can be kept down to the lowest point.

The cooled and finely-powdered product is exhausted with successive portions of *cold* water, the liquid filtered, and nitrate of barium added. Carbonate of barium is thus precipitated. The mother-liquid, treated with nitrate of lead, yields pure cyanate of lead; this can be washed thoroughly, and dried at a gentle heat, and preserved for use. Unlike cyanate of potassium, it is a permanent salt, and could be produced at a moderate price, if required.

To prepare urea, it is simply necessary to digest with sufficient water at a gentle heat, equivalent quantities of cyanate of lead and sulphate of ammonium, filter and evaporate. I have found the result most satisfactory.

The compound ureas may, in like manner, be produced by substituting the sulphates of the compound ammonias for the ordinary sulphate of ammonium; the experiment has been tried and found successful.—*Chemist and Druggist, March*, 1868.

ON LIQUOR BISMUTHI ET AMMONIÆ CITRATIS.

By C. H. Wood, F.C.S.

Through the medium of the advertisement columns of the medical journals Mr. Schacht, of Clifton, has recently cast some disparagement on the Liquor bismuthi et ammoniæ citratis of the new British Pharmacopœia. As this preparation is obviously intended to represent the very elegant solution of bismuth introduced into pharmacy a few years back by Mr. Schacht himself, it becomes a matter of some interest to determine the justice of Mr. Schacht's remarks upon it. Although Mr. Schacht's process has not been published, analysis has shown that the original "Liq. Bismuthi" contains an ammonio-citrate of bismuth, and several methods have been proposed for producing this compound. But most of these have been somewhat complicated and troublesome.

The process given in the Pharmacopœia possesses two great advantages. It is extremely simple and easy of execution, and it furnishes a liquor of perfectly uniform and definite strength. Assuming the materials employed to be pure, it yields a solution of ammonio-citrate of bismuth containing only nitrate of ammonia in addition. We may fairly suppose that the authors of the Pharmacopœia considered this latter salt to be a harmless constituent of the solution, or they would have taken means to exclude it.

In the advertisements I have referred to, however, it is alleged that the Pharmacopœia preparation will contain, in addition to the nitrate of ammonia, "almost invariably arsenic and copper, and frequently antimony, etc." These, it is stated, will be derived from the impurities notoriously prevalent in metallic bismuth.

It must be admitted that the presence of these metals in varying proportions would detract from the value of the Pharmacopœia solution, and constitute an objection to the officinal process. Having prepared several samples of this liquor, operating strictly according to the instructions of the Pharmacopœia, I thought it desirable to examine them carefully for these metallic impurities. When the liquor was prepared from metallic bismuth, *pu-*

rified as the Pharmacopœia directs, I failed to detect either copper, arsenic, or antimony. In no case could I find the last two metals, but in one case I obtained a trace of copper. The liquor which contained it, however, was prepared from metal imperfectly purified, for the fusion with nitre was not carried on sufficiently. It is to be observed that the Pharmacopœia directs the commercial bismuth to be *twice* fused with nitre, stirring the molten mixture for a quarter of an hour each time. Copper is the most abundant impurity of bismuth, and would most readily pass into the liquor prepared from metal containing it. When ordinary commercial bismuth is employed for the preparation of the liquor in place of the purified bismuth ordered, the resulting solution does undoubtedly contain copper, and may contain traces of arsenic and antimony; although the latter is mostly deposited from the nitric acid solution as insoluble antimonic acid, together with at least part of the arsenic as arseniate of bismuth.

Judging from the experiments I have made, I think it is safe to conclude that when the Pharmacopœia instructions are properly carried out, the process yields with the greatest facility a solution of ammonio-citrate of bismuth which is associated only with nitrate of ammonia, and is in other respects pure and trustworthy. But the substitution of commercial for purified bismuth would be an improper departure from the directions of the Pharmacopœia, and would be likely to cause the introduction of objectionable impurities into the preparation. The purification of the metal is an important part of the process.

Although the Pharmacopœia process is a very satisfactory one, I have found it advantageous, in manufacturing this liquor, to depart from the letter of the instructions, and to employ, in the place of metallic bismuth and nitric acid, the crystallized ternitrate of bismuth, as proposed by Mr. Tichborne some years back. This modification of the Pharmacopœia process, while it is in some respects more ready and convenient, happens to afford greater security for the purity of the product. It has the additional advantage also of introducing a minimum and uniform quantity of nitrate of ammonia into the resulting liquor. The crystallized nitrate is readily obtained and easily kept. When bismuth is dissolved in nitric acid, the solution, after concentra-

tion, deposits well formed crystals of the ternitrate. These may be drained on a funnel, and dried by exposure to the air on a porous tile, or on white filter paper. They are perfectly definite in composition, having the formula $Bi(NO_3)_3$, $5\,H_2O$, and they undergo no change by keeping. By long exposure to the air they slightly effloresce, but that is all. If the salt be prepared from commercial bismuth, a second crystallization only is required to render it pure. The preliminary purification of the metal may, if desired, be thereby dispensed with. 995·15 grs. of this salt contain 430 grs. of bismuth, and is, therefore, the quantity to be used in lieu of the metal and nitric acid ordered by the Pharmacopœia.

The process I follow is arranged for a gallon of liquor, and is as follows:—

Cryst. ternitrate of bismuth . .	18¼ oz. (av.)
Citric acid	20 oz.
Liq. ammon. fort.	1 pint, (Imp.) or *q. s.*
Distilled water	*q. s.*

The citric acid is dissolved in two pints of the water, and the crystals of nitrate added. They rapidly dissolve, and after a little time a white precipitate begins to form. As soon as the nitrate was dissolved, the ammonia diluted with an equal bulk of water is added, little by little, until the precipitate is dissolved, and the liquid is neutral. The resulting solution is, if necessary, filtered, and diluted to the volume of one gallon.

It will be observed that I employ rather more citric acid than the P. B. orders. This I find to be desirable when the crystals are employed in lieu of the nitric solution.

The quantities for a pint are as follows:—Ternitrate of bismuth 995 grs.; citric acid 2½ oz.; liq. ammoniæ and water *q. s.*

It might have been an advantage if Mr. Tichborne's process had been given in the Pharmacopœia instead of the present one, but this would have necessitated the introduction of the crystallized ternitrate as a distinct preparation, and the authors may have considered that confusion would arise if two nitrates of bismuth were officinal.—*Pharm. Journ., March*, 1868.

BLUE-BLACK WRITING INK.

A correspondent has sent us the following recipe for a blue-black writing-ink, which, he says, answers very well for a copying-ink:—

Take of Aleppo Galls, bruised . . .	5½ ounces.
Cloves, bruised	¼ ounce.
Sulphate of Iron . . .	1½ "
Sulphate of Indigo, in the form of a slightly-acid paste (Sulphindylate of Potash?)	1½ "
Sulphuric Acid	35 minims.
Rain Water, cold	40 ounces.

Macerate the galls and cloves in 20 ounces of the water for a week; decant the liquor, and add to the residue of the solid ingredients 10 ounces of the water, with which continue the maceration for four days; then decant as before, and repeat the maceration with the remaining 10 ounces of water for another period of four days. Mix now the whole of the liquors, recovering from the galls all that can be obtained by squeezing them in a cloth, and afterwards filter. To this add first the sulphate of iron, then the sulphuric acid, and lastly the indigo paste. Care must be taken that the indigo does not contain much free acid.—*Lond. Pharm. Journ., March*, 1868.

IMPURITIES IN GLYCERIN.

To the Editor of the Chemical News.

SIR,—The writer of the article on glycerin in *Kunst and Geweberblatt* is correct in attributing the acrid, irritating properties of some glycerin to the mode of preparation; but I have distilled glycerin which was quite as unsuitable for medicinal or surgical purposes as any spoken of. The volatile fatty acids and ethers, which exist in crude glycerin, are sometimes condensed with the glycerin, and these have very irritating properties.

In the glycerin which is made without distillation, the volatile acids, and ethers exist, but not in the same state as after distil-

lation, the high heat required for this process decomposing them into some modification of their original state.

The great cause of irritation in glycerin which has not been properly prepared, is the presence of oxalic acid and of formic acid ; these are produced by the action of sulphuric acid upon the glycerin, forming the first mentioned acid, and this in its turn acts upon the glycerin, giving rise to formic acid, the irritating properties of which are well known.

The nitrate of silver test I have always considered the most reliable. Glycerin, which shows no reaction with this salt, may be considered suitable for all uses, as it indicates not only the the presence of chlorine or chlorides, but is, as well, reduced by acids which may exist in the glycerin.—I am, &c.

HENRY BOWER.

Philadelphia, January 16th, 1868.

—*Chemical News, Feb.* 7, 1868.

PRESERVATION OF SYRUP OF IODIDE OF IRON.

BY THOMAS B. GROVES, F.C.S.

The appearance of Mr. Tilden's paper on the above subject has suggested the publication of the following note of experiments in the same direction made in May, 1865.

Having heard expressed the opinion that syrup of iodide of iron when made from iron filings kept better than a corresponding syrup made from pure iron in the form of wire, it occurred to me that such (supposing the statement to be true) could only arise from the presence, in the syrup, of substance owing their existence to the impurities usually found in the iron from which filings are commonly obtained.

The most prominent of these impurities and those only likely to be concerned in this matter are phosphorus and sulphur, which, when treated in the presence of water, with excess of iodine, form respectively phosphoric and sulphuric acids, according to the following equation :—

$$P+I_5+8HO=PO_5,3HO,5HI.$$

Query, then would either or both of these acids when added to

syrup of iodide of iron tend to its preservation, *i. e.* to prevent its acquiring color when exposed freely to the air?

I was the more readily inclined to answer this question in the affirmative from a belief that I had somewhere seen recommended for the same purpose the use of citric acid. (After a long search I have failed to ferret out the paper in which the observation occurred, and am therefore unable to credit the author of the suggestion with the "kudos" due to him.)

I may observe that a strong solution of iodide of iron, prepared with pure iodine and iron in the form of fine wire, invariably reddens litmus paper. Whether it is due to impurities in the iron, or is characteristic of neutrally constituted iodide of iron, not having by me an absolutely pure specimen of iron, I cannot say.

My experiments were conducted by making seven specimens of syrup—from iron wire, best iron tacks, common iron tacks, wire + acid. sulph. dil. ♏ j per oz., ditto + acid. phos. dil. ♏ ij per oz., ditto + acid. phosph. dil. ♏ ij and acid. sulph. dil. ♏ j per oz., ditto + acid. phosph. dil. ♏ viij per oz.

These were placed in partially filled bottles and exposed for some months to diffuse daylight. It was soon apparent that the acidulated syrups had a decided advantage over those not acidulated. The syrup made from best tacks was superior to that made from wire; that made from common tacks was inferior to either; the nature of the acid appeared to be immaterial.

Since then I have settled down to the use of dilute phosphoric acid, of which I add half a fluid-ounce to each pharmacopœia quantity (31 fl. oz.). With that proportion I find the syrup keep perfectly well for any length of time, and without the slightest reference to the bottle containing it being full or only partially full. If I remember right a less proportion does not answer quite so well, and would not meet the case of a country dispenser with irregular calls for the syrup. Purists will, of course, object to this tampering with the Pharmacopœia, so should I perhaps, but I do it *permissu superiorum*. Besides which I may truly say that I have never in the course of dispensing found any reason to regret the presence of the interpolated ingredient.

Before adopting this expedient I used to seal up my stock in six-ounce bottles, which I completely filled with the hot syrup and then tied over with strong and well-soaked bladder-skin. This, after several trials, I found the best mode of excluding the atmosphere.

It is obviously necessary to observe one precaution,—don't add the acid to the syrup before it has completely cooled. Not observing this, I on one occasion found a batch of syrup go utterly wrong from the formation and crystallization of glucose, which, singularly enough, did not make its appearance until the bottles of syrup had been uncorked for a day or two.

I was quite at a loss to explain the *modus operandi* of the phosphoric acid, until it occurred to me to ascertain how the syrup so additioned would bear dilution with water, and how keep when so diluted. Mere dilution did not affect its transparency when the proportion of water to syrup was as seven to one even, but on exposing the mixture in an open vessel to the air, I observed the fluid to gradually deposit a white sediment of perphosphate of iron, until about half the water had spontaneously evaporated; then, and not till then, did it begin to assume the tint of oxidizing iodide of iron.

The coincidence of the disappearance of the phosphoric acid, and the evolution of free iodine, seemed to prove the preservative effect of the acid to be due to the fact that the iron, as soon as it arrives at the state of peroxidation, is at once seized by the phosphoric acid, and the compound thus formed being insoluble in any of the fluids present, the reduction of the hydriodic acid by the peroxide is prevented. We have, of course, still the free hydriodic acid, but in the presence of syrup it is oxidized very slowly, in fact almost imperceptibly.

An experiment will at once prove my hypothesis correct. To a solution of any iodide add a little persalt of iron,—an immediate evolution of free iodine will be the result, according to the following equation:—

$$Fe\,I + Fe_2Cl_3 = 3\,Fe\,Cl + I.$$

That the iodine is "free" is proved by the readiness with which it is removed from solution when shaken with ether,—an observation first made by Dr. Squire, I believe.

If, however, previous to the addition of the iron salt a little phosphoric acid be added, no coloration takes place until the whole of such acid has first been removed in the form of perphosphate of iron. In order for this latter experiment to succeed perfectly, the iron should be combined with an acid that in the free state has not the power of dissolving perphosphate of iron, —with acetic acid, for instance. The presence of a minute quantity of hydrochloric acid would tend to keep the perphosphate in solution, and coloration more or less would consequently ensue.

According to this view, phosphoric acid is the only acid that can be relied on for the preservation of syrup of iodide of iron, and my first impression as to the utility of sulphuric acid could only have been true in a very limited sense. In the long run, it could not have been otherwise than harmful.—*London Pharm. Journ.*, March, 1868.

ON A WET METHOD OF REDUCING CHLORIDE OF SILVER.

By Dr. Graeger.*

There are many methods of reducing chloride of silver with which we are acquainted, but the majority of them are surrounded by difficulties of some kind or another; either the silver recovered is not perfectly pure, or the manipulation of the process is attended with serious loss, or it is impossible for the whole of the chloride to be reduced at one operation. Now, as the reduction of chloride of silver is an operation which has very frequently to be performed, a method whereby these difficulties are overcome will be welcomed with pleasure; and so often have I felt the shortcomings of the methods at present employed, that it has always been my constant endeavor to discover a better and more serviceable mode of proceeding. In making my inquiries, I have always had in view the advisability of seeking for a wet method of reduction, as I regarded the same as the easiest manner of working, and involving less loss of material. The reduc-

* *Neues Jahrbuch für Pharmacie.* We abridge the translation given in the *Photographic News.*

tion of chloride of silver by means of iron, zinc, or copper in an acid liquid is well known to be an unsatisfactory method, as the product is always found to be contaminated to a more or less degree with the metals employed; the same result occurs if the chloride of silver is reduced by means of copper in an ammonia solution. At the same time, no mention has ever been made of the employment of zinc to reduce the chloride out of the ammonia solution. I find, however, that by using this metal, silver of a perfectly pure description may be obtained.

In order to reduce chloride of silver by means of zinc, it is first dissolved in ammonia, and placed in a bottle, and pure zinc in small excess, and in fragments of notable size (so that it may be easily separated after the process of reduction), is then added. The decomposition commences at once, and proceeds so rapidly, especially if the vessel is well agitated, that in the space of three hours, a quarter of a pound of chloride of silver may be reduced; the duration of the operation depends, however, of course, on the greater or less excess of zinc present in the solution. A certain excess of ammonia will likewise have the effect of accelerating the operation. At first, the precipitated silver assumes a light grey or dirty white color, but towards the end it becomes dark grey, or even black. A few drops of the ammoniacal solution should be examined in a test-tube from time to time, and precipitated with hydrochloric acid; the operation is at an end when no turbidity is apparent on the addition of the acid. When this is the case, the precipitate is allowed to settle down, and the clear liquid then poured off as completely as possible; the silver in the glass vessel is treated again and again with fresh water until all smell of ammonia has disappeared, and is then transferred to another bottle by means of a funnel, the tube of which has previously been stopped with a few fragments of glass, to prevent the pieces of zinc from passing through at the same time as the silver particles. The superabundant water is then decanted as completely as possible, and the precipitate treated with concentrated hydrochloric acid, in which it is allowed to digest until the dark grey color has given place to one of a dirty white. If the silver contains much water, it is possible that it may not become white on a single treatment with the hydrochloric acid; in

this case, the liquid must be again poured off, and a fresh quantity of acid added. By this means, the silver may always be obtained of a white color, and when the operation has advanced thus far, the precipitate is repeatedly washed, until the water poured off is only very slightly acid. The silver is then collected on a filter, and well washed with distilled water; finally, a little dilute ammonia is poured on it, and it is again washed with water. This treatment is rendered necessary, in order to remove any minute quantity of chloride of silver which may have been formed by the action of the concentrated hydrochloric acid, the latter sometimes containing small quantities of free chlorine.

The silver produced in this manner is of a very pure description; at any rate, I have never been able to detect the presence in it of any other metal. When dissolved in nitric acid, and precipitated with hydrochloric acid, a fluid is obtained, which, when neutralized with carbonate of soda, does not become turbid by treatment either with ferro-cyanide of potassium or alkaline carbonates. It assumes a brownish color on the addition of sulphide of ammonium, owing to the presence of dissolved chloride of silver, but no precipitate is formed.

The expenditure of ammonia in the operation is, of course, not inconsiderable, but, as the greater portion of it may be recovered by distillation, the actual loss of the same is hardly appreciable. In working with large quantities of chloride of silver, economy may be exercised in the use of ammonia by reducing the chloride in several operations, so that the ammoniacal solution of chlorine and zinc, when freed from the silver, is again used to dissolve the chloride. This appears somewhat strange, but is evidently due, in part, to the presence of free ammonia, which exerts an action upon the chloride of silver only when the silver has been separated. Such a mode of proceeding would, however, occur only when manipulating with a considerable bulk of chloride of silver, for, in reducing small quantities, the necessary amount of water required to dissolve the chloride may easily be added.

In the same way, nitrate of silver dissolved in ammonia may also be reduced with zinc, perfectly pure silver being obtained;

this result takes place even when the nitrate solution contains copper, as is very often the case. The copper, it is true, becomes reduced by the zinc in the ammoniacal solution, but only very slowly as compared with the silver, and hardly at all so long as a certain quantity of the latter is present in the solution. By this means, I have been enabled to separate the whole of the silver from old coins, containing but twenty-five per cent. of that metal. Every particle of silver must not, however, be separated; or, what is the same thing, the quantity of zinc added should be insufficient to precipitate the whole of it. The process possesses the particular advantage, that in order to separate copper from nitrate of silver, it is not necessary to transform the latter into chloride before it can be reduced. The finely-divided silver must, however, be treated in the manner described above, with concentrated hydrochloric acid, and afterwards well washed, to remove the particles of precipitated zinc. For the production of pure nitrate of silver, this method is especially recommended, as by its employment the tedious operations of washing the chloride of silver, and its subsequent reduction in crucibles, are entirely dispensed with.—*London Chemist and Druggist*, March 14, 1868.

DESTRUCTION OF THE GREAT DRAGON TREE OF TENERIFFE.

The great Dragon Tree of Orotava, Teneriffe, the King and Nestor of the Monocotyledons, is no more. A drawing of it made by Mr. Borda, one hundred years ago, was published about 60 years ago by Humboldt, who first drew scientific attention to this vegetable wonder. The late Mr. Webb published, in his history of the Canaries, figures of it taken after the storm of July 21, 1819 had destroyed half its crown; and it has recently been described, measured and photographed by Prof. Piazzi Smyth. He gave the trunk a girth of 48½ feet at the lowest accessible part, and a height of 60 feet. Fenzi of Florence, who announces the demise of the tree, makes the circumference about 78 English feet, but intimates that he was not able to measure it exactly. When he visited it, a year ago, "it was still in excellent health, its immense crown covered with innumerable panicles of scarlet fruits, and the huge trunk, although completely

decayed in the interior, sustained vigorously the spreading mass of fleshy branches and sword-like foliage." He charges the destruction of this famous historical monument to the sheer carelessness of the Spanish authorities, who might have prevented it by keeping up sufficient props. That venerable trunk was, it is said, as hollow and about as large in the year 1402 as in recent times; and the hollow had even then been used immemorially by the Guanches for religious rites. The age of 6000 years which has been assigned to it by some of the "most sober naturalists" may not be very greatly exaggerated. Probably even the cavity was as ancient as the oldest of California Redwoods.—*Am. Jour. Sci. and Arts*, March, 1868. A. G.

TEST FOR BROMIDES.

By Surgeon J. H. Bill, U. S. Army.

In conducting some investigations during the past summer, on the physiological relations of the halogens, it became absolutely necessary, in the course of the experiments, to devise a ready and sensitive test for bromine in the presence more particularly of chlorine.

Any analyst will bear out the assertion—although the books make light of the matter—that it is a difficult thing to recognize traces of bromine in the presence of excess of the other halogens. Thus in the case stated above, it was found impossible to obtain, by the ordinary methods of the books, a certain and easy recognition of bromine, when chlorine was present.

The Fresenius test solution of auric chloride produces, in faintly acid solutions of alkaline bromides, a coloration ranging from dark orange red to light straw color, according to the strength of the solution. Iodides must be out of the way. Chlorides, however, do not interfere in the least. The following is the best way of applying the test: Separate iodides by palladium, and after getting rid of excess of palladium, by sulphuretted hydrogen, concentrate the solution to about twenty-five cubic centimeters. Select two test tubes of the same size and shape and color of glass. Into one pour the solution suspected to contain bromide. Into the other pour pure water, adding perhaps a trace

of chloride potassium; add now to each test tube a drop of chlorhydric acid, and then to each *one* drop of auric chloride solution. On now comparing the two tubes, particularly in the direction of their long axes, a yellow color will be observed in the tube containing the bromide, and made very manifest by comparison with the other tube.

The following experiment shows the delicacy of the test applied as above. One centigram of potassic bromide was dissolved in one thousand cubic centimeters of water. Thirty centimeters of this solution compared with thirty centimeters of a very weak solution of potassic chloride, gave a decided yellow color. This experiment was varied by dissolving a gram of potassic chloride in two thousand cubic centimeters of water, halving, and adding one centigram of potassic bromide to the one half. Thirty centimeters of each of the two solutions now tested, gave ample evidence of the presence of bromide.

The mixed chloride and bromide should be brought to the state of salts of the alkalis if necessary, by precipitating with argentic nitrate, thoroughly washing, and fusing with potassic carbonate. If sodic carbonate is used, the subsequent reaction with the gold test is not so decided.

A test for chloride in the presence of bromide, as simple and delicate as the above, is much needed. The writer has sought long for it but in vain.

1607 N. 6th St., Philadelphia, Pa.

—*American Journal of Science and Arts, March*, 1868.

Varieties.

Mercerising Cotton.—To Mr. Mercer must be attributed the discovery of the peculiar action of caustic, soda, and sulphuric acid upon cotton. This singular process, now called "mercerising," has the effect of untwisting the normally twisted flattened tubes of cotton filaments and converting them into cylindrical tubes. When colors are applied to the cotton so treated, they pass more readily through the minute pores of the tubes and are precipitated in denser layers in the interior of the latter, whereby darker and more permanent shades are produced. Calicoes so treated

become greatly increased in strength, and though hitherto no large quantities of cloth thus prepared have been printed, owing to the expense of preparation, advantage has been taken of the process to prepare the cotton fabric used in the production of the endless web known to calico printers as the india rubber blanket, which, when made with prepared calico, is rendered much more durable.—*Lon. Chem. News, July* 12, 1867, *from Proc. Lit. Phil. Soc., Manchester.*

A Sodium Catastrophe Averted.—In the course of last winter the river Irwell rose nearly twenty feet above its ordinary level, and flooded the works of the Magnesium Metal Company on the Salford side to a depth of about seven feet in every part. There were then from three to four hundred-weight of sodium in stock, and, soon after the commencement of the flood, the room in which the sodium was stored was two feet deep in water; but, as it rained in torrents, it was then considered best not to run the risk of attempting to move it off the premises. The sodium was stored in long narrow jars, with loosely fitting covers, made air-tight by allowing the bottoms of the lids to rest in a circular groove filled with oil. As the flood did not abate, and the position began to grow more dangerous, one of the men volunteered to go on the roof of the sodium shed and watch the water rise, and for hours he lay upon the roof in a soaking shower of rain, watching the sodium jars Inch by inch the water rose, and at last, when it was only half a foot from the top of the jars, he drew his head out of the the hole in the roof where it had been sticking so long and summoned the rest of the men. They unslated the roof of the store room, let themselves down into the water, now reaching nearly to their armpits, and removed the sodium lump by lump into other vessels placed among the rafters of the roof. By accident one little ingot of sodium fell into the water, causing the courage of the men to falter; but the lump fortunately only fumed and fizzed, and dissolved away without exploding. After the flood was over the Magnesium Metal Company built a platform near the roof, on which all sodium is now stored. We have not heard what bonus the Company voted to the men who removed the sodium, especially to the one who stuck to the top of the roof like a limpet to a rock in a storm, but doubtless it was something handsome.—*Lon. Chem. News, July* 12, 1867, *from British Journal of Photography.*

Simple and Durable Label.—At a late meeting of the Massachusetts Institute of Technology, of Boston, Hon. M. P. Wilder made a statement relative to a new method of labeling trees, accidentally discovered by him. In the use of zinc labels, which were the most durable in character, an indelible ink was used; but, not having the ink at hand on one occasion, he wrote upon the zinc with a lead pencil. This writing, although it could be rubbed when first made, grew more distinct and durable with age, and after several years could not be erased except by scraping.—*Jour. App. Chem., May*, 1867.

Glycerin Lotion for Chapped Hands and Face.—Make a mucilage of quince seeds, by simmering one drachm of the seeds in a half pint of boiling water for ten minutes, and then straining; of this mix one ounce with an equal quantity of inodorous glycerin, and six ounces of orange flower or rose water. The above is an excellent wash for the hands and face in cold weather, and, compared with many of the lotions sold by the druggists, is quite inexpensive. A little borax may be added to this preparation if desired.—*Jour. Applied. Chem.*

Fossils Preserved in Ice.—About 40,000 pounds of fossil ivory—that is to say, the tusks of at least 100 mammoths—are bartered for every year in New Siberia. As many as ten tusks have been found lying together in the "Tundra," weighing from 150 to 300 pounds each. Notwithstanding the enormous amount already carried away, the stores of fossil ivory do not appear to diminish. In many places near the mouths of the great rivers flowing into the Arctic Ocean, the bones and tusks of these antediluvian pachyderms lie scattered about like the relics of a ploughed-up battle-field. Entire mammoths have occasionally been discovered, not only with the skin—which was protected by a double covering of hair and wool—entire, but with the fleshy portions of the body in such a state of preservation that they have afforded food to dogs and wild beasts. The mammoths appear to have been suddenly enveloped in ice, or to have sunk into mud which was on the point of congealing, and which, before the process of decay could commence, froze around the bodies and preserved them in the condition in which they perished. It is thus that they are occasionally found when a landslip occurs in the frozen soil of the Siberian coast, which never thaws, even during the greatest heat of summer, to a depth of more than two feet; and in this way, within a period of a century and a half, five or six of these curious corpses have come to light from their icy graves. A very perfect specimen of the mammoth in this state was discovered in the autumn of 1865, near the mouth of the Jennissei. An expedition was dispatched to the spot by the Imperial Academy of Science last summer, and Mr. Lumley, Her Majesty's Secretary of Embassy, states that it is considered the result of the expedition will disclose some interesting facts in the natural history of a former creation.—*St. Louis Med. Rep. Nov.* 1867, *from Exchange.*

The Pyengadow, or Iron-Wood.—We learn that officers who conducted the survey made in British Burmah, in passing along the Beeling Valley, observed this magnificent tree growing on the hillsides. It is no uncommon thing to see the first branch of these trees at a height of eighty feet from the ground, the stem being perfectly straight up to that point. It is unfortunate that up to the present time no means have been found of making use of this timber, which, from its hardness, effectually resists the attacks of white ants and other insects. This valley is described as rich, and adapted for almost any cultivation.—*London. Pharm. Journ., March,* 1868.

A New Source of Naphtha.—In the 'Athenæum,' February 15, 1868, we read—"The belief expressed by some geologists that naphtha would be found in the Caucasus has been realized. A boring 276 feet deep, near Kuaaco, has struck a source of this liquid, which yielded 1500 barrels daily for one month; more recently a second source has been discovered near the former, from which the naphtha jets to a height of 40 feet above the ground, and flows out at the daily rate of 6000 barrels.—*London Pharm. Journ., March*, 1868.

Preparation of Iodhydric Acid.—C. Winkler. Instead of preparing this acid by passing a current of sulphuretted hydrogen through water, containing iodine in suspension, the author proposes the following plan of working. Iodine is dissolved in carbonic disulphide, water placed on the top of this, and the sulphuretted hydrogen passed to the bottom of the vessel into the iodine solution. The dark color of the latter gradually becomes lighter, while the iodhydric acid formed is completely absorbed by the water. The sulphur which separates remains dissolved in the carbonic disulphide.—*Ibid, from Journ. pr. Chem.* cii. 33.

Mustard Paper.—M. Rigollot, a Paris pharmacien, has, under the name of *papier sinapisé*, contrived an elegant preparation which embraces all the advantages of the mustard cataplasm without incurring the risk of its inefficiency, owing to the loss of power in the flour of mustard. He has done this by extracting the fixed oil while retaining the rubefacient principle. A piece of the paper of the required size is put in water for a few seconds and placed wet on the part, whereon it is bound with a handkerchief. It does not cost more than the ordinary mustard plaster, and is always ready and promptly efficacious.—*Hays Journal*, from *Med. Times and Gaz.*, and *Bull. de Thérap.*, Sept. 30.

[B. J. Crew, of Philadelphia, has introduced a portable mustard plaster spread on paper, which appears to retain the properties of the mustard, and is very convenient.—*Editor A. J. Pharm.*].

The Giant Ostrich of Madagascar.—In the year 1850 two enormous eggs, found in the bed of a stream in Madagascar, were sent to Paris, accompanied by a small portion of a skeleton, and on a careful examination by the naturalists of the Garden of Plants, it was ascertained that the remains belonged to a species of the ostrich family, of vastly greater size, however, than any now known to exist. The largest of these eggs measured about 13½ inches by 9, and was estimated to be equal in capacity to six eggs of the African ostrich, twelve of the American, and to twelve dozen of those of the common hen. A cast of this egg is, we believe, in the magnificent museum of our Academy of Natural Sciences. The bird itself was supposed to have been nearly fourteen feet high. Another nearly perfect egg of this bird, named *aepyornis maximus* by the Paris naturalists, was sent a few years ago to London, where it sold for

an enormous price, and during the present year still another had reached Paris. This was found in a sandy alluvium, at a depth of about five feet, and is entirely perfect with the exception of a small hole at one end, through which it had probably been emptied by some native in early times. The dimensions of this egg are much the same as the one referred to; the capacity is about 500 cubic inches, or more than two gallons.

Remains of these gigantic eggs are not very numerous among the natives of that portion of Madagascar where they are found, and are used as drinking vessels. Perfect specimens are, however, very rare. There is a tradition in the country that the bird is still in existence in the interior, although this is very improbable. That, like the Dode, the Solitaire and the Great Auk, it has disappeared within the historical period, is quite credible. The natives maintain that the bird laid but one egg, always dying soon after.—*Public Ledger, March* 5, 1868.

Deodorising Petroleum.—Your correspondent O. P. A. desires to receive information on the preparation of "plumbate of soda," and its use and application in deodorising petroleum. When oxide of lead or litharge is added to a pretty concentrated solution of caustic soda, the oxide of lead is dissolved therein, and may be considered to play towards the soda the part of an acid; the clear solution may be used with advantage to deprive petroleum of some foul smelling compounds it may happen to contain, especially as sometimes occur organic sulphur compounds, by thoroughly shaking and mixing the petroleum with the plumbate of soda, and afterwards giving sufficient time for the liquids to separate in two layers; the upper layer being the petroleum, the latter will have to be washed with water to remove the adhering soda, and should then be deprived of moisture by applying lumps of caustic lime.—Dr. A. A.—*London Chem. News, Jan.* 10, 1868.

Minutes of the Philadelphia College of Pharmacy.

The 47th Annual Meeting of the Philadelphia College of Pharmacy was held at the College Hall, Filbert St., on the evening of the 30th of March, 1868; twenty-five members present.

In the absence of the President, Vice-President Dillwyn Parrish was called to the Chair.

The minutes of the last meeting were read and approved.

The minutes of the Board of Trustees were read by Alfred B. Taylor, Secretary of the Board. By the reading of these minutes the College is informed that at the late Commencement the diploma of the College was conferred upon forty-eight graduates, as follows:

John W. Beck,	*Podophyllum Peltatum.*
Abraham Boyd,	*Cynips Quercifolii.*
Thomas F. Bradley,	*Extemporaneous Pharmacy.*
Eugene C. Bronson,	*Hypericum Perforatum.*
A. B. Clark,	*Caulophyllum Thalictroides.*
J. E. Corbidge,	*Pharmaceutical Manipulations.*
Robert L. Day,	*Caulophyllum Thalictroides.*
S. Levin Dilks,	*The learning and general principles of the Drug business*
Mortimer H. Eayre,	*Duties of the Apothecary.*
Fred. G. Elliott,	*Lycopus Virginicus.*
Howard England,	*Chemistry as applied to Agriculture, Arts, and the daily concerns of life.*
Horace W. Eastlack,	*Podophyllum Peltatum.*
W. L. Farr,	*Gelsemium Sempervirens.*
James Foulke,	*Extracta Fluida of our Pharmacopœia.*
James J. Fronheiser,	*Kryolite.*
Joseph Harrop,	*Taste and Odor of Cod-Liver and Castor Oils.*
Jacob K. Hecker,	*Polygonum Punctatum.*
Pratt R. Hoagland,	*Veratrum Viride.*
Henry A. Jorden,	*Cornus Florida.*
Joseph Karch,	*Lappa Major.*
Samuel D. Kay,	*Benzoin Odoriferum.*
Charles C. Klump,	*Cinchona.*
Benjamin Lillard,	*Cimex Lectularius.*
Edward McInall, Jr.,	*Chlorodyne.*
Robert T. Marshall,	*Aqua.*
Charles C. Matthews,	*Chelone Glabra.*
Orlando L. Moore,	*Juglans Cinerea.*
T. Bryan O'Brien,	*Professional intercourse between the Apothecary and Physician.*
Franklin Ottinger,	*Spigelia Marilandica.*
Clemmons Parrish,	*On the physical characteristics of the Officinal Powders.*
William H. Raser,	*Hydrastis Canadensis.*
William C. Rice,	*Stillingia Sylvatica.*
Clarence M. Schellinger,	*Elaterium.*
Robert L. Seybert,	*Cimicifuga Racemosa.*
Joseph B. Shaw,	*Buchu.*
John N. Shoffner,	*Verbascum Thapsus.*
Joseph B. Shropshire,	*Datura Stramonium.*
Allen Shryock,	*Ennomos Subsignaria.*
B. F. Shugard,	*Prinos Verticillatus.*
Samuel F. Simes,	*Cryolite.*

Matthias Simon,	*Benzoin Odoriferum.*
Homer A. Smith,	*Aralia Nudicaulis.*
George P. Stackhouse,	*Hydrargyrum cum Cretâ.*
Louis Stiefel,	*Iris Versicolor.*
Frank W. Thomas,	*Frasera Walteri.*
William H. Webb,	*Apocynum Androsæmifolium.*
Charles Wilson,	*Arsenicum.*
William Wilson,	*Geum Rivale.*

The minutes of the Board of Trustees further inform that a portrait in oil of Benjamin Ellis, M.D., was presented to the College by the Zeta Phi Society.

George Y. Shoemaker and H. B. Lippincott were recommended by the Board of Trustees for resident membership, they having been in business on their own account for the period of six years. An election being ordered, Ambrose Smith, acting as teller, reported the unanimous election of the candidates.

Prof. Edward Parrish made a verbal report for the delegates to the last meeting of the American Pharmaceutical Association. The proceedings of the Association having been published, a detailed account will be found in the transactions of the Association.

The Committee on Deceased Members announced the decease of Prof. Michael Faraday, of London, an honorary member of this College. An extended notice of Prof. Faraday has been published in the Journal of the College.

Thomas S. Wiegand, Secretary of the Committee having in charge the subject of the sale of the present College premises, and the erection of a new building, reported the sale of the premises for the sum of fifteen thousand dollars, and that possession was to be given to the purchaser on the 1st of April next. Mr. Wiegand further reported subscriptions to the building fund of about $6,300.

The following resolution was read and adopted :

Resolved, That the sum of fifteen thousand dollars, to be received from the sale of the present College premises on Filbert street, be appropriated to the Committee of Ways and Means, or the Building Committee appointed by the said Committee of Ways and Means; and that an order be drawn on the Treasurer of the College for that amount, when collected by him ; to be appropriated, together with such sums as may be collected by that Committee from donations or otherwise, to pay the cost of erecting and furnishing the new Hall.

On motion of Prof. J. M. Maisch, the Chair appointed the following Committee to make suitable arrangements for the meeting of the American Pharmaceutical Association in this city in September next :

A. B. Taylor, James T. Shinn, Edward Parrish,
Wm. Procter, Jr., Chas. Bullock.

On motion, the new hall of the College was tendered for the use of the Association, if completed in time for said meeting.

The Secretary presented a specimen of cryptopia, a new alkaloid from opium discovered by Messrs. T. and H. Smith, of Edinburgh, received from those gentlemen; an account of which is published in the Journal for September, 1867.

A bill presented by the Secretary for $4.42, for postage stamps and envelopes, was ordered to be paid.

A communication from Samuel N. James, declining re nomination as a member of the Board of Trustees, on account of removal from the city, was read and accepted.

A letter from Charles Ellis, President of the College, declining re-election, was read. After careful consideration, it was moved and unanimously adopted that the resignation be not accepted.

The report of the Committee on Latin Labels was read and accepted.

The Publishing Committee reported that the Journal of Pharmacy had been regularly issued during the past year. The numbers for July and September were ably edited by Prof. Maisch, during the absence of the editor in Europe. The subscription list has considerably increased during the past year, requiring an increase in the number printed. The financial condition of the Committee is rather more favorable than last year, but the report still exhibits a deficit, due to the want of punctuality in the payment of subscriptions.

The annual election being ordered, Caleb H. Needles and Daniel S. Jones, acting as tellers, reported the election of the following officers:

President,	Charles Ellis.
1st Vice-President,	Dillwyn Parrish.
2nd Vice-President,	William Procter, Jr.
Treasurer,	Ambrose Smith.
Recording Secretary,	Charles Bullock.
Corresponding Secretary,	Alfred B. Taylor.

Trustees,

Prof. Robt. Bridges, M.D., T. S. Wiegand, T. Morris Perot,
Daniel S. Jones, Prof. J. M. Maisch, Jas. T. Shinn.
Samuel S. Bunting, Chas. L. Eberle.

Publishing Committee,

Charles Ellis, Prof. Edward Parrish, A. B. Taylor,
Prof. J. M. Maisch, Wm. Procter, Jr.

Delegates to the American Pharmaceutical Association,

William B. Webb, Prof. Robt. Bridges, M.D., Wilson H. Pile, M.D.,
Thos. S. Wiegand, Caleb H. Needles.

The Secretary was directed to enter the following on the minutes:

The members of the College are reminded that the present is the last meeting of the College within the walls of the present building, where for many years they have so pleasantly conferred together. On separating,

and bidding adieu to the present locality, they hope that their next regular assembling will be under pleasant auspices, in a building better adapted to the growing necessities of the College, and that each member will feel a renewed interest in the Philadelphia College of Pharmacy.

On motion, then adjourned.

CHARLES BULLOCK, *Secretary.*

Minutes of the New York College of Pharmacy.

The New York College of Pharmacy held its annual meeting March , 1868.

The diploma of "Graduate in Pharmacy" was conferred upon—

Geo. P. Cunningham, Utica, N. Y.
Wm. H. Green, Newbern, N. C.
Henry C. Morse, Elmira, N. Y.
Hampden Osborne, Farmville, Va.
Paul Plessner, Saginaw, Mich.
Alonzo F. Snelling, Richmond, Va.
Wm. Wenzel, New York.

The President, John Milhau, addressed the young men, giving them some excellent advice as to the manner in which they should pursue the profession in future years.

The annual election of officers was then held, resulting as follows:

President,—John Milhau.

Vice-Presidents,—Wm. Neergaard, Geo. C. Close, Isaac Coddington.

Treasurer,—William Wright, Jr.

Secretary,—P. W. Bedford.

Trustees,—Paul Balluff, John Carle, Jr., Theobald Frohwein, Arthur W. Gabaudan, Thos. T. Green, Henry T. Kiersted, Bernard H. Reinold, John W. Shedden, David Hays.

Delegates to the Annual Meeting of the American Pharmaceutical Association,—Geo. C. Close, Isaac Coddington, Theobald Frohwein, Ferdinand F. Mayer, Wm. Wright, Jr.

P. W. BEDFORD, *Secretary.*

Editorial Department.

THE OLD COLLEGE BUILDING AND THE NEW HALL.—Immediately after the Annual Examinations were concluded, the old College Hall, in Filbert Street, presented a busy scene. By order of the Board of Trustees the building was to be transferred to the purchaser, J. B. Lippincott, on the 1st of April, so that only two weeks were left in which to secure the Library, cabinets of Materia Medica and Chemical Specimens, the Herbarium and the Apparatus, in boxes, and to remove them and the furniture of the rooms to the places where they were to be stored, until the new building should be ready. By the unremitting attention of Mr. Wiegand, of the Building Committee, aided by the Professors and some

other members, this troublesome but responsible work was accomplished, ready for the cartmen, and before the 30th of March, the day of the Annual Meeting, when the building was used officially for the last time, nearly two hundred boxes, that were required to contain all that was capable of being packed, were sent away. Those of us whose memories stretched back to the inauguration of the old hall, could recall the feelings of gratulation which, in that twelfth year of the Institution, arose on the occasion among both members and students. Now, like an outgrown garment, it is abandoned for newer and larger accommodations, but with mingled feelings of thankfulness for our prosperity, and with regrets for the necessity of leaving the old hall where so much of the history of pharmaceutical progress in the United States has been written and acted.

At a general meeting of the committee of Ways and Means, held at the house of the Treasurer, D. Parrish, the Building Committee exhibited the plans and elevations of the proposed College Hall, on Tenth Street above Cherry street, after discussing which, the several bids for the contract for its erection were opened and read, and the contract was awarded to Henry B. Cook, for the sum of $27,000, requiring him to finish and deliver the building by about the 20th of August. The general outline of the building is rectangular, 47 feet by 72 feet, and fifty feet in heighth, divided into three stories, with an offset in the north-west corner to accommodate the stairs. A division wall of brick divides the building unequally about one-fourth of its length from the western end, rising through all the stories. The first floor will include a room for the Practical Laboratory, 43 x 25, a general meeting room, 43 x 30, and a room for the Trustees. The general meeting room will contain the museum cases, and trustees room the library cases. The second and third stories each contain a lecture room 50 x 43, capable of seating 350 students, and along side of each lecture room a committee room and a room for the Professors. The rise of the seats from the floor will be about 8 feet, affording beneath them two long narrow rooms on the north side, for the storage of the stock of Journals in the 2d story, and the Proceedings of the Association in the third story. The entrance will be a three-storied front, 17½ feet wide on 10th street, north of Cherry, built specially for college purposes and for a janitor's residence. It is the intention of the college to have a janitor of sufficient intelligence to look after the various interests of the Institution concentrated at the Hall, so that members can get entrance at any reasonable time. The various details of lighting, heating, water supply and drainage, have been carefully provided for. The building material is to be brick, the general style of the structure plain and substantial, and the roof of double tin, painted.

Fire at Powers & Weightman's Laboratory.—On the morning of February 29th, a fire broke out in the southern end of this establishment, which, before it was subdued, destroyed property to the value of

$150,000. Some men were engaged in emptying a still connected with the extensive apparatus for extracting cinchona, in the manufacture of Quinine, when in some way not well understood, an explosive condition of the atmosphere of the room from the escape of alcoholic vapor took place, which was ignited accidentally, blew out the side wall, burnt several men badly, and set fire to the buildings. The fire invaded the quinine and morphia departments which is the main cause of the serious loss. Besides a large amount of bark under treatment and ready for use there was an unusually large quantity of opium in course of extraction, (about 5000 pounds,) only a small portion of which was saved. The value of iron doors as a protection from fire was shown. In one direction the fire was cut off by them, and in another its ravages would have been stopped but that some one in the hurry had opened them to look after the fire and then forgot to close them. With their usual energy, the firm have already restored part of the buildings and have partly resumed their operations in the departments injured.

Chicago College of Pharmacy.—The Annual Meeting of this Institution was held in Rice's Building, March 10th, and was largely attended. The proceedings exhibited a healthy and energetic condition of the College and a determination to bravely push its interests forward. On the first of September there were $1500 in the Treasury. The Library Committee Fund was $725. Two lecturers have been obtained for the school if finally decided on. A resolution was passed, authorizing the Board of Trustees to encourage the establishment of a monthly journal devoted to the interests of Chemistry, Pharmacy and the collateral sciences, the same to be published by authority of the Chicago College of Pharmacy, and to be assumed by the College, should it hereafter desire such a Journal.

The Board of Trustees was empowered to take measures to establish a course of lectures on Pharmacy.

The President, E. H. Sargent, delivered the annual address. He congratulated the members on the increased prosperity of the College, and on the prospect of greater usefulness in future. He argued that Chicago was large enough to support a College of Pharmacy, and that besides they could look for students to the entire North-west. The library just commenced, contains 125 volumes, the cabinet 700 specimens, which he expected would be much extended by Mr. Ebert, on his return from Europe, where he was making a collection. The President hoped that the Chicago College was now in a condition to invite the Association to meet there next year, as there was only one Western city that contained more members than Chicago. After some other business the annual election was held, which resulted in the following board of officers.

President, E. H. Sargent; *1st Vice President*, J. W. Mill; *2d Vice President*, J. W. Ehrman; *Treasurer*, J. P. Sharp; *Secretary*, Louis

Strehl; *Cor. Sec'y.*, Thomas Whitfield; *Trustees*, Henry Biroth, W. F. Blocki, H. D. Garrison, Albert E. Ebert, N. Gray Bartlett.

THE TAX ON ALCOHOL.—Many efforts have been made to reach the understanding of Congress in reference to the great burthen of this tax on legitimate manufacturers requiring Alcohol, and the disastrous inroads it has caused on public morals by presenting a temptation too strong for resistance by the officials to whose care the revenue laws relative to whiskey are committed. The following memorial is a new effort and explains itself.

To the Congress of the United States:

The Philadelphia Drug Exchange, composed of the Druggists, Manufacturing Chemists and Pharmaceutists, Perfumers, and others, beg leave to lay before your Honorable bodies a brief statement.

The manufacture of chemicals is probably larger in Philadelphia and its vicinity than in all the rest of the United States. Many processes of this manufacture depend mainly upon Alcohol as a material, or as a medium; so that the *useful* consumption of Distilled Spirits is perhaps more fully represented in our Association than in any other single organization of this country. The amount of this consumption for industrial purposes, in Philadelphia, is estimated to be, under favorable circumstances, about twenty thousand barrels of proof spirit annually.

On March 21st, 1867, when the evasion of the $2 tax had become common and safe, the Drug Exchange took the following action:

"*Whereas*, The Amendatory Tax Law passed by Congress at its last session, contains this clause:—

"SEC. 21. *And be it further enacted*, That whenever any Distilled Spirits so found, elsewhere than in a Bonded Wharehouse, shall be sold or offered for sale at a less price than the tax imposed by law thereon, such selling or offering for sale as aforesaid shall be taken and deemed as *prima faciæ* evidence that said spirits have not been removed from a Bonded Warehouse according to law, and that the tax imposed upon the same has not been paid, and the same shall, without further evidence, be liable to seizure and forfeiture.

"*And Whereas*, We are anxious to maintain and vindicate our character as law-abiding citizens, however easy or profitable the violation of the law might be;

"*And Whereas*, In such adherence to the letter and spirit of the law, we are liable, through dishonorable competition, to the loss of all that part of our business which depends upon the use or sale of distilled spirits: Therefore

"*Resolved*, That we, members of the Philadelphia Drug Exchange,—Druggists, Manufacturing Chemists, Perfumers and Brokers,—*will not buy, offer, or sell distilled spirits, or alcohol*, either directly or indirectly, *at a less price than the Government Tax*, either by a net price, or by any commission, drawback, return, or any counterbalancing advantage whereby the spirit of the law may be violated, or its intention defeated.

"*Resolved*, That for our own protection, and for the assistance of the Government, we will endeavor by every honorable means to discountenance and discourage any evasion of the law, and to prevent the recurrence of any such violations which may come to our knowledge."

These resolutions were signed by a large portion of the Drug and Manufacturing interest, and were faithfully adhered to, through constant temptation and most trying loss.

Meantime, all manufacturers and dealers in whose business the article

enters, who were anxious to comply with the law, saw their trade gradually pass into channels not obstructed by scruples on this point. Their constant appeals and patient waiting have developed only more clearly the helplessness or indifference of the Government officials, notwithstanding the stringent provisions of the law.

We beg, therefore, to add our earnest protest against further experiment with the tax of two dollars per gallon on Distilled Spirits. Its results as to revenue, and to public morality, we may confidently leave to be judged by your honorable bodies; but for the interests of honest industrial pursuits, we earnestly urge that its failure and injustice are demonstrated. The demoralization already caused by it will be felt by generations to come. The Druggist, the Chemist, the Perfumer, the Varnish-maker, see with dismay, a gloomy alternative presented. They may maintain the law and incur the ruin of their business; or, they may violate it, and bear the humiliating consciousness of complicity with fraud, in order to earn their daily bread.

We respectfully petition that the tax may at least be reduced to *fifty cents per gallon*, as recommended by the Special Commissioner of the Revenue. The same evils, in degree, might exist at that rate; but the main motive of enormous gain being withdrawn, distillation would be likely to return to its legitimate channels, and to fall again under the control of those responsible establishments who have shown some disposition to meet the demands of the Government.

Our deliberate conviction is, however, that a lower rate,—probably 25 cents per gallon—will ultimately be found to be more desirable, for both revenue and morals. It would restore the use of Distilled Spirits to many branches of industry from which it is now excluded by its high price. A prominent instance is the manufacture of White Lead, in which several of us are engaged, and in which large quantities of Whisky were formerly used; but we have been compelled to seek a cheaper substitute. A low price would also extend its consumption among Varnish-makers, Dyers, Soap-makers, and for many minor uses.

For the Philadelphia Drug Exchange,

ROBERT SHOEMAKER, *President.*

GERMAN EXCHANGES.—Through the aid of our friend Albert E. Ebert, now in Munich, we have been able to make arrangements for exchange with six of the prominent German Pharmaceutical Journals.

CREW'S SPREAD MUSTARD PLASTER.—The great value of the mustard poultice as a rubefacient in cases requiring rapide counter-irritation is universally admitted, but the inconvenience of applying them is often very great, especially when the patient is not in bed. Several attempts have been made to prepare a portable and permanent mustard plaster, of which the "Papier Sinapisé" of M. Rigollet (see p. 276 of this Journal) is an example. We have also seen a translucent paper called "Cooper's Sinapine Tissue," or mustard paper, which appears to owe its rubefacient power to capsicum, and is not entitled to the name of mustard paper,—both tasting and smelling of Cayenne pepper. Our attention has been directed to this subject by an examination of the mustard paper of Benj. J. Crew, who has been for some time past engaged in working out the problem of an *efficient* and *portable* mustard plaster. This he has succeeded in doing perfectly. The mustard in substance forming a uniform layer on the

paper, sufficiently pliable, adheres firmly, and when dipped in water is ready for application in half a minute, adhering sufficiently to be easily retained in position with a bandage. Applied to the arm its action was sensibly manifested in three minutes, with the usual symptoms of good mustard. As this preparation retains its power unaffected by age so long as it is kept dry, it will be found exceedingly valuable in all cases where a rubefacient is indicated, and convenient for travellers and country physicians, as well as in families.

THE LABORATORY.—A weekly record of Scientific research. London, April to October, 1867 : pp. 449.

About a year ago this journal was commenced, in London, under the editorial auspices of John Cargill Brough, and was admirably sustained, editorially and by many excellent contributions. But at the end of six months its patronage, though increasing, did not justify its continuance. With the last number, Sept. 28, the editor expressed a hope that its suspension was only temporary, and that it would reappear with the current year. In expectation of this proving a fact, we have waited so long that it seems probable that the project of resuscitation has been abandoned. Among the papers it contained, was a series of letters on the chemical and metallurgical objects in the Paris Exhibition, well worth preserving.

CONSUMPTION IN NEW ENGLAND AND ELSEWHERE, or soil-moisture one of its chief causes. Address delivered before the Massachusetts Medical Society. By Henry J. Bowditch, (second edition), Boston, 1868 : pp. 154 octavo.

This is an attempt to prove the existence of a general law under which Phthisis is engendered in a community or in isolated families, and this law looks to the average condition of the atmosphere as influenced by the soil-moisture resulting from bad drainage. A map of Massachusetts, colored in a way to indicate the prevalent condition of each township, is given. Numerous and widely extended observations are needed to establish such a law.

Fourth Annual Report of the Alumni Association of the Philadelphia College of Pharmacy; containing also the Valedictory Address delivered to the Graduating Class of 1868, by Edward Parrish, Prof. of the Theory and Practice of Pharmacy. Philadelphia, 1868 : pp. 40.

It is a commendable feature of the Alumni Association, that it thus preserves, in a connected form, the main features and documents of the Annual Commencements. Besides the address of Prof. Parrish, which is an earnest appeal in favor of public encouragement to scientific institutions, the report contains an account of the presentation of the portrait of the late Dr. Benjamin Ellis, by the Class, and its reception on behalf of the College, by Prof. Bridges, whose excellent remarks in relation to Dr. Ellis are given in detail. The Secretary reports the Alumni Fund for the practical school to be $4425, and hopes it will soon be $5000. The minutes of the fourth annual meeting are also presented, including

the address of President Wiegand, from which we learn that the Association now numbers 190 members. After four years of faithful service as Secretary, Mr. William C. Bakes, retires from office, succeeded by Clemmons Parrish.

Constitution, By-Laws and Code of Ethics of the Chicago College of Pharmacy, with a list of Officers and Members. Organized and incorporated Sept. 5, 1859. Chicago, 1867.

From the tone of this pamphlet it may be inferred that the Chicago College of Pharmacy has turned over a new leaf, and is about to commence a career of increased usefulness. The programme for the School of Pharmacy proposed to be established is given, and it is more than probable that it will commence in the fall of 1868. So far as we have heard the faculty have not been appointed.

A Manual of the Dissection of the Human Body.—By Luther Holden, F.R.C.S., Assistant Surgeon and Lecturer at St. Bartholomew's Hospital, London. With notes and additions by Erskine Mason, M.D., Demonstrator of Anatomy at the College of Physicians and Surgeons, and Surgeon to the Charity Hospital, New York. Illustrated with numerous wood engravings. New York, Robert M. DeWitt, Publisher.

From R. M. DeWitt, through Lindsey & Blakiston, too late for notice.

OBITUARY.

Dr. Stephen Procter, formerly of Philadelphia, died March 26th, at Hot Springs, Arkansas, aged 55. He graduated in Pharmacy in 1834, and in Medicine in 1843. He was the only surviving brother of the Editor of this Journal.

Dr. John Davy, F. R. S., the brother of Sir Humphrey Davy, died at Ambleside on the 24th of January, 1868. He was born at Penzance in 1790, and graduated at Edinburgh in 1814. He had considerable reputation as a chemist and physiologist, and wrote the life of his brother Sir Humphrey.

Prof. A. V. Vogel, M. D.—A recent German exchange announces the death of this German chemist at Munich, in the 90th year of his age. His name is connected with many chemical investigations, and his numerous contributions to the *Journal de Pharmacie*, commenced in 1811, continue through many volumes. He was the oldest member of the Academy of Sciences of Munich.

Sir David Brewster.—This great natural philosopher died on the 10th of February, 1868, at Allesley House, near Melrose, in his 86th year. His career has been long and successful. He commenced his studies in science at the University of Edinburgh, and took his degree of M. A. in 1800. In 1815 he was presented with the Copley medal of the Royal Society, for a valuable paper on the polarization of light; and afterwards made

many discoveries connected with the subject of light. He was a prominent founder of the British Association, and in 1832 was knighted by William IV. One of his last efforts was to disprove the authenticity of the letters produced by M. Chasles to the French Academy, invalidating the claims of Sir Isaac Newton to the discovery of the law of gravitation. Sir David retained his powers and love of science to the last, and, like Faraday, was one of the brightest intellects in the British galaxy of scientist.

William Herapath, F.C.S., of Bristol, England, died on the 13th of February, in the 73d year of his age. He was well known as a toxicological chemist. He discovered the curious compound iodosulphate of quinia, which possesses optical properties like those of tourmaline, and made its analysis. He was Professor of Chemistry at Bristol, and one of the founders of the Chemical Society.

Dr. Daubeny, of Oxford, England, died on the 12th of December, 1867, at the Botanical Gardens, in his 72d year. He was educated at Oxford, graduated in medicine, was elected to the professorship of Chemistry in 1822, and became a member of the Royal Society. He afterwards was elected to the professorship of Botany, and became Curator of the Botanical Gardens, having resigned the practice of the profession of medicine. He wrote several works, among which was a description of volcanoes, and lectures on Roman agriculture. His contributions to science were numerous and varied.

Robert Warington, F.R.S., died at Budleigh, in Devon, on the 12th of November, 1867, and was born at Sheerness, Sept. 7th, 1807. He was apprenticed to Mr. T. Cooper, a manufacturing chemist, where he acquired his bent for chemical pursuits. In 1828 he was chosen by Prof. Edward Turner as his assistant for three years; he next became the chemist to Messrs. Truman, Hanbury and Buxton, the great brewers, during eight years, when, at the death of Mr. Hennell, he succeeded him as chemical operator at Apothecaries' Hall, a position he continued to hold until a year before his decease. Mr. Warington took an active interest in matters connected with chemical science, and was concerned in the founding of the Chemical Society, the Cavendish Society, and the Royal College of Chemistry. He was repeatedly engaged as a revisor in connection with the London and British Pharmacopœia, and in all things relating to the higher interests of pharmacy he was ever an active and useful observer. In natural history he was particularly interested in the investigation of the relations of vegetable and animal life, as exhibited in those natural conditions represented by the aquarium, and published various papers on the subject. His papers are very numerous, and were often the practical applications of chemistry in the arts; one of the most useful of them was his discovery of the power of animal charcoal in separating bitter and other principles from liquids, noticed whilst engaged at the breweries. Mr. Warington married in 1835, and leaves a family.